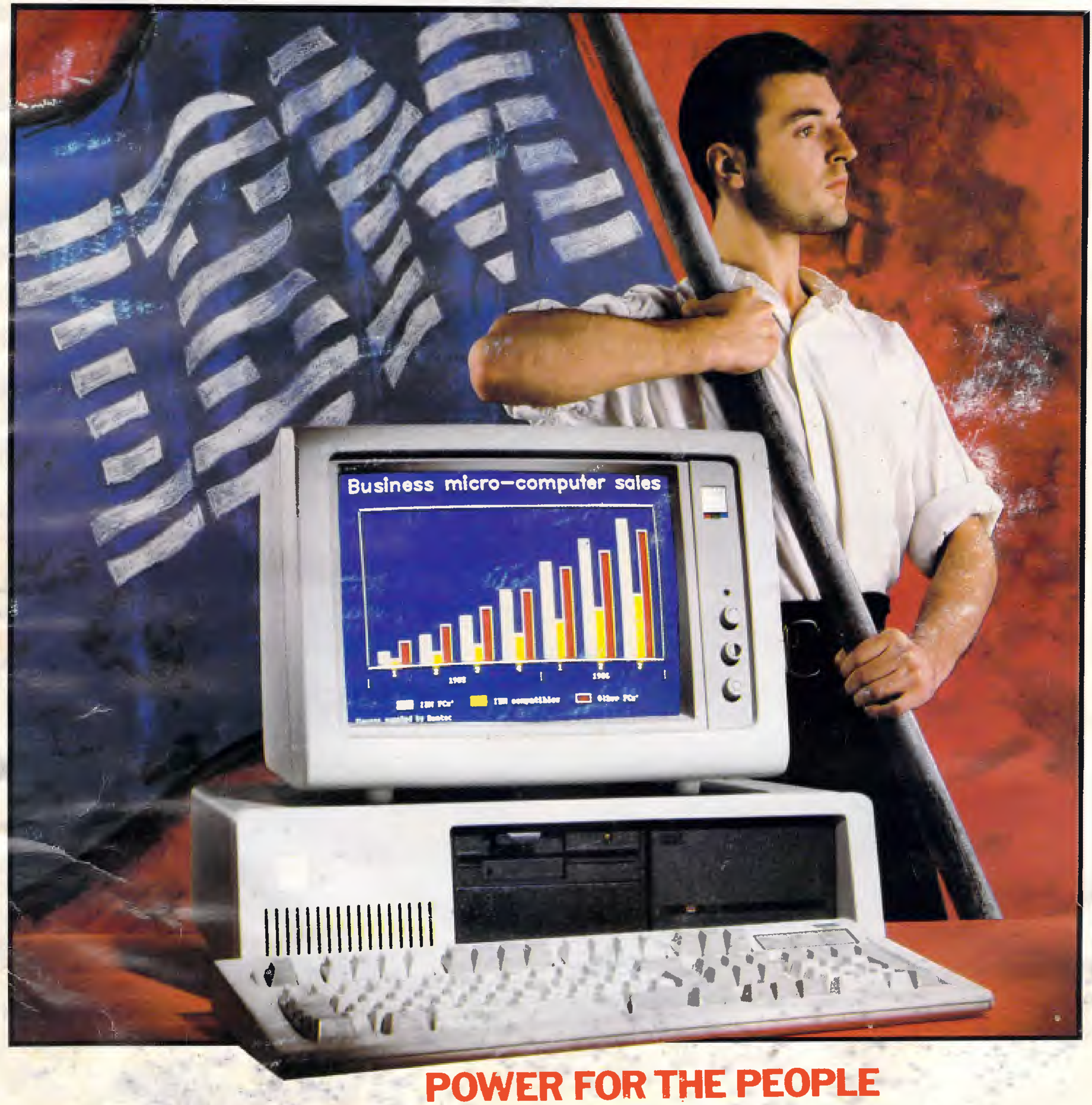
Australian Personal Computer

ISSN 0725—4115 NZ $3.50
REGISTERED BY AUSTRALIA POST PUBLICATIONS VBP 3691

JANUARY 1987 $3.50

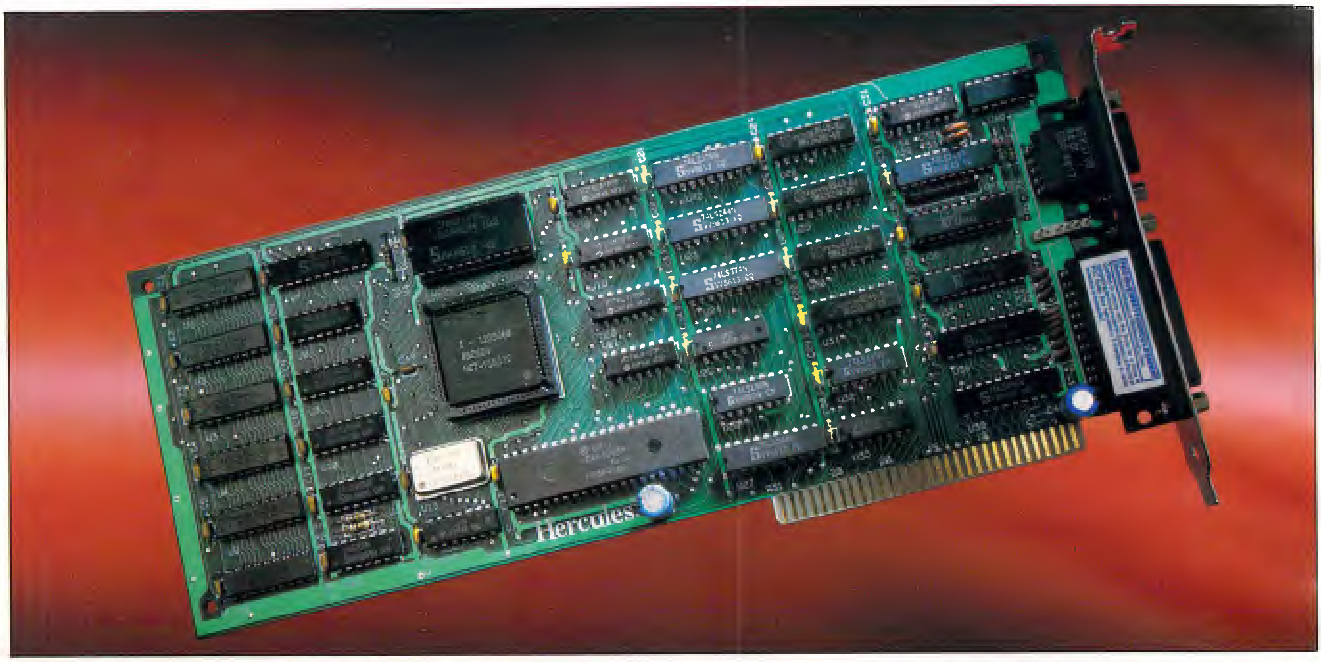
AUSTRALIA'S TOP SELLING COMPUTER MAGAZINE

RUN MACINTOSH SOFTWARE ON AN ATARI!



POWER FOR THE PEOPLE

IBM's new standard PC–the XT286



Introducing
The Hercules Graphics Card Plus

It's 100% compatible with our original card and costs 40% less. And that's not even the reason to buy one.

The reason is RamFont, an entirely new mode of operation that is unique to the Graphics Card Plus.

The idea for RamFont first occurred to Hercules co-founder and chief engineer Van Suwannukul, two years ago.

At the time he was working with Microsoft engineers on their new word processor, later known as Microsoft Word.

Microsoft's engineers knew that soon there would be very high resolution laser printers offering multiple typefaces.

VAN SUWANUKUL AND KEVIN JENKINS, CO-FOUNDERS HERCULES

They reasoned that if you could print italics and boldface, you should be able to see italics and boldface on the display.

Unfortunately, the Microsoft engineers were ahead of their time.

It was not possible, with the graphics cards that existed at the time, to get both the flexibility to display multiple typefaces, and the speed that is essential to a word processor.

Van knew that to solve Microsoft's problem, new hardware would be needed.

So he invented RamFont.

Word 3 – Three times faster.

Two years later, the Hercules Graphics Card Plus was ready.

What Van had developed was RamFont, an new mode that could store, and then display at lightning speed, 3072 programmable characters.

By this time, Microsoft's engineers had used every trick in the book to speed up Word, and succeeded in making Word 3 considerably faster than earlier versions.

However, for many users it still wasn't fast enough.

So you can imagine how delighted Microsoft's engineers were when they saw Word 3 running over three times faster on the Hercules Graphics Card Plus.

At last their word processor could really process.

1-2-3 Release 2 fulfills its promise

At Hercules, we knew that this was just the tip of the iceberg. RamFont was a revolution waiting to happen.

The more we used it, the more possibilities opened up.

Take 1-2-3 Release 2 for example.

Release 2 has an optional character set that nearly doubles the size of the viewable spreadsheet.

It's a great idea... until you try scrolling up and down or right and left. It takes forever.

As RamFont has the ability to display characters ranging in size from 8 by 4 to 9 by 16, it was easy to adapt Release 2's smaller characters.

The result is that now you can scroll a far larger spreadsheet as fast as version 1A could scroll a smaller one.

Then another idea occurred to us.

If RamFont could be programmed to display characters, why couldn't it be programmed to display graphics?

Well, it turned out it could.

So we did a bit more work and now you can draw 1-2-3 graphs in a window on top of your spreadsheet, and view your data in the background.

(Or, you can still view a graph on a full screen if you prefer.)

We liked what RamFont did for Word and 1-2-3 so much we did the same thing for Symphony and Framework.

LOTUS
1-2-3 RELEASE 2

Can a graphics card be a work of art?

Van will tell you that the Hercules Graphics Card Plus is the best monochrome graphics card he's ever designed.

Which is significant because 1) Van is not given to exaggeration, and 2) his three previous designs have met with a certain degree of success.

What makes the Graphics Card Plus so good is a chip Van designed called the V112.

The V112 does three things.

First, it runs every single one of the thousands of programs written for the IBM Monochrome Display/Printer Adapter.

Second, it runs every single program written for the famous Hercules 720 × 348 graphics standard.

And third, it makes RamFont possible.

Survival of the fittest

Actually, chips like the V112 do something else.

They make our products even more reliable.

One chip manufacturer was astonished when we told him that we test 100% of the nodes on a chip. He said 93% was common.

By testing each chip individually to such high specifications, we are able to weed out weak V112s before they go to assembly.

Then we subject the survivors to more testing at temperatures above 70°C, weeding out whatever weaklings are left.

V112

After the V112 has been thoroughly tested, we insert it into a fully assembled Graphics Card Plus. (Incidentally, all our PC boards are 100% tested, which is another rarity.)

Then batches of the finished product are heated in ovens to greater temperatures than you are ever likely to encounter.

While still hot, the Graphics Card Plus is placed in a PC just like the one you use, and we run special software that exhaustively tests all functions.

Then, as a final precaution, each tested unit is carefully placed in an anti-static bag to protect it during shipment.

Free software, and parallel ports.

Hercules has become famous for the software we include with each monochrome graphics card.

And the Graphics Card Plus has the best software yet.

You get a program to extend the life of your monitor.

And to print graphics.

Then Fontman, a program that makes it easy to create your own RamFont characters.

Plus 25 fonts to get you started.

Plus everything you need to run 1-2-3 Release 2, Microsoft Word 3, Symphony 1.1, and Framework II.

And the Graphics Card Plus comes with a parallel printer port that you can disable. (Some PC compatibles require this.)

What price perfection?

With the RamFont breakthrough, 100% compatibility with our original card, free software, a parallel printer port, and the Hercules Graphics Card Plus should cost at least $1200.

Surprise. Its suggested list price is only $595 ex. tax.

If you think that the Graphics Card Plus must be the ultimate monochrome card, you're not alone.

John Dvorak, *PC magazine* columnist, said this about the Graphics Card Plus:

"If you intend to buy an IBM or clone and want to run a monochrome system, this is the card to get. I wouldn't even think about anything else."

Neither would we.

Hercules.
We're strong on graphics.

ARCOM PACIFIC
BOX 13, CLAYFIELD
BRISBANE, QUEENSLAND
BRISBANE: (07) 52 9522
SYDNEY: (02) 957 4678
MELBOURNE: (03) 51 9446

119 FERRARS STREET
SOUTH MELBOURNE,
VICTORIA 3205

Trademarks/Owners: IBM/IBM; Lotus, 1-2-3, Symphony/Lotus; Microsoft; Framework II/Ashton-Tate; Hercules, RamFont, Font Man/Hercules.

APC CONTENTS

Volume 8, Number 1, January 1987

REGULARS

5 NEWSPRINT

Guy Kewney reports from Comdex in Las Vegas.

27 WEST COAST CONNECTION

The future of word processing according to Tim Bajarin (and Steve Jobs) plus other news from the States.

40 BANKS' STATEMENT

Martin puzzles over artificial intelligence, feels more at home with expert systems and looks forward to the day computers will understand all.

108 SCREENPLAY

After working for the US Government tracking Russian spies, Stephen Applebaum finds the time to relax playing Trivial Pursuit on his Commodore 64.

111 WHAT'S NEW

All the important product announcements, relayed by Ian Davies.

121 SUBSET

David Barrow presents low-level assembler routines to create a Z80 computer diary.

128 END ZONE

A full user groups listing, plus computer chess, numbers theory, puzzles and an events diary.

143 COMMUNICATIONS

Steve Withers' full bulletin board listing.

146 PROGRAM FILE

CP/M lives on and on. With this month's lead programming feature you can now add multi-tasking to your ageing CP/M machine.

166 SUBSCRIPTIONS

What can happen if you don't send us your cash.

168 ADVERTISERS INDEX

Anyone who's anybody gets their name listed here.

Editorial *Managing Editor* Sean Howard; *Assistant Editor* Maria Bokic; *Consultant Editors* Steve Withers, Ian Davies. **Advertising** *Advertising Manager* Mark Reiss; *NSW and Qld Sales* Michael Komoroski. *NSW and Qld Sales Executive* John Nuutinen (02) 264 1266; *Vic, SA, WA and Tas Sales Manager* Gerard Kohne (03) 531 8411. **Production** Graphic Heart Pty Ltd. **Distribution** *Subscriptions Manager* Judy Welsh (02) 264 1266; *Subscription rates* Australia $42 per annum, overseas A$70 (surface) A$160 (airmail); *Newstand sales:* Network Distribution Co. 54 Park Street, Sydney 2000.
Publishers Computer Publications Pty Ltd (a subsidiary of Consolidated Press (Holdings) Ltd).

Sydney Office: 215 Clarence Street, Sydney 2000; telephone (02) 264 1266; telex AA 20514 CONPRES. **Melbourne Office:** 77 Glenhuntly Road, Elwood 3184; telephone (03) 531 8411; telex AA 30333 'AMJ'.
Printed by Quadricolor International (Aust.) Pty Ltd. Material contained within *Australian Personal Computer* is protected under the Commonwealth Copyright Act 1968. No material may be reproduced in part or whole without written consent from the copyright holders. Produced under licence from Computing Publications and VNU Business Publications B.V.

FEATURES

32 SELLING YOURSELF

Thought of selling a program you've written? This is what the publishers want, and how you can sell it to them.

77 FRACTAL SETS

An excellent introduction to the world of Julia sets and Mandelbrot sets described in detail by Dr MM Novak and Jack Weber.

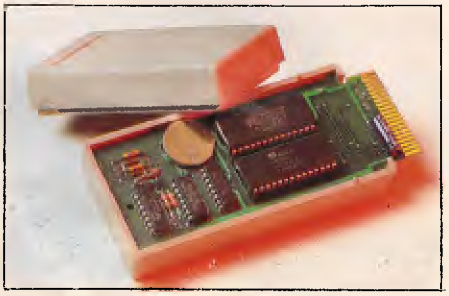
97 A FUTURE VISION

Mike James speculates on what the programmer of the future can look forward to.

104 LITERARY CHOICE

David Levy describes the issues and techniques used in computer-generated poetry and fiction.

Ian Davies is on holidays. His MS-DOS Programming series will re-appear next month with a surprisingly useful routine to slow down PCs.



BENCHTESTS & REVIEWS

18 IBM XT 286

IBM has raised the standard of its entry-level machine. The new IBM XT 286 includes as standard an 80286 processor and a 20 Mbyte hard disk, but beyond that it's a strange beast. Peter Jackson examines the machine that the clone makers will follow.

44 MAGIC SAC

Magic Sac transforms an Atari ST into an Apple Macintosh, giving ST owners access to thousands of Macintosh applications. Nick Walker watches the magical conversion.

49 MACINTOSH TURBO PASCAL

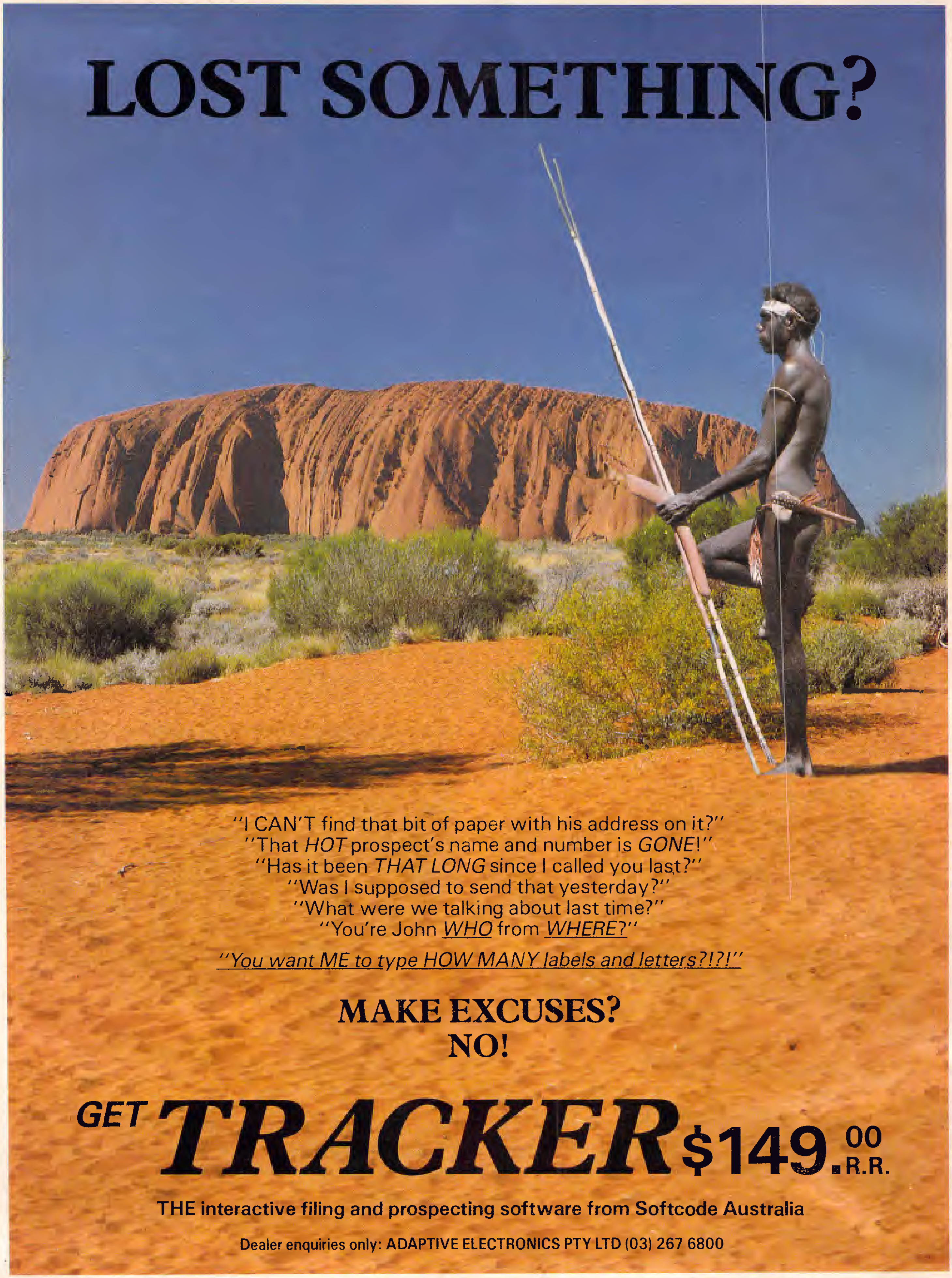
Macintosh products seem to have been immune from the recent trends in budget software. Now Borland looks set to change that with a release of Turbo Pascal for the Macintosh. Owen Linderholm tests it out.

65 PC FILE

Is it worth laying out good money for an IBM PC database when you could 'try' a shareware product? Kathy Lang puts a leading contender, PC File, through its paces.

87 NEWSROOM V FLEET STREET EDITOR

Desktop publishing is possibly the most fashionable thing you can do with your PC at the moment. Nick Walker takes a look at two low-price page layout packages for the IBM PC.



LOST SOMETHING?

"I CAN'T find that bit of paper with his address on it?"
"That *HOT* prospect's name and number is *GONE*!"
"Has it been *THAT LONG* since I called you last?"
"Was I supposed to send that yesterday?"
"What were we talking about last time?"
"You're John WHO from WHERE?"

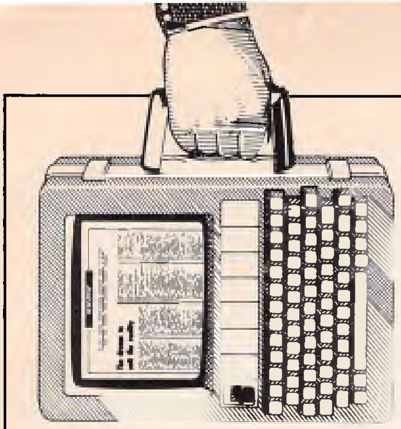
"You want ME to type HOW MANY labels and letters?!?!"

MAKE EXCUSES?
NO!

GET *TRACKER* $149.00 R.R.

THE interactive filing and prospecting software from Softcode Australia

Dealer enquiries only: ADAPTIVE ELECTRONICS PTY LTD (03) 267 6800



REPORT FROM COMDEX FALL, LAS VEGAS
10-13 November 1986

Taking the wraps off Amiga 2500

Four IBM PC slots, connected to each other and to nothing else, have been included in the latest computer from Commodore — the Amiga 2500, due out in March. It will include the ordinary Motorola 68000, not (as everybody thought) the much more powerful 68020. It will have a new standard, 100-pin Amiga bus. There will be room in the box for a lot more than today's single 3.5in floppy drive — in fact, there will be room for three disks, one of which can be a 5.25in drive.

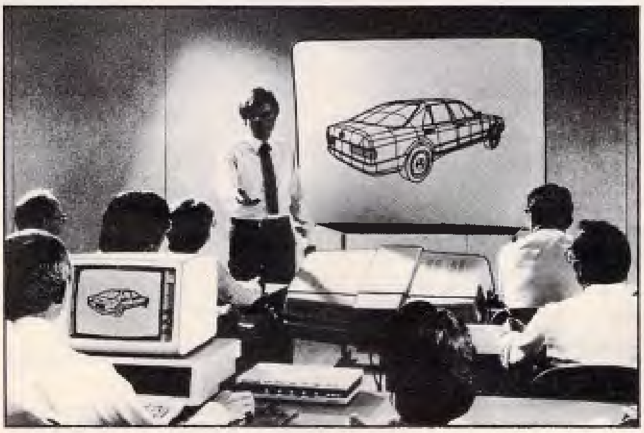
The machine is officially still secret. It was known as the 'Ranger' until it unveiled in Monterey, California, to a collection of slightly dubious software developers, and it is meant to be the top of the range of three models, with the original Amiga being renamed the Amiga 1000, in the middle of the range.

This 2500 machine has been expected ever since the original Amiga was launched last year. Almost nothing about it is exactly what people expected. Even so, it's pretty impressive, and if Commodore lives long enough to launch it, it could make a big difference to the Amiga family.

Almost no information whatsoever was available on the baby Amiga, however, which surely must be the most important of the three.

Commodore's sales bosses, in Monterey, spoke earnestly about the need for a new strategy. This includes, for the first time in America, apparently, the original notion of spending money advertising it. It also includes the idea of 'migrating' people from their current seven million Commodore 64s (there will be eight million by the time Commodore stops making that machine) to the Amiga.

Logically, that means that the new Amiga must cost something close to $750. I bet you anything it doesn't, but we'll have to wait and see what Commodore does, before pouring scorn on it.



You want high resolution? Try this Electrohome projection system. It runs at twice the scan rate of the fastest Professional Graphics Adaptors available today — at 65KHz. No, I don't know how on earth they took the picture. I suppose fast scan rates make it easier. The cost? A piffling $US12,000. Details in Canada on (519) 744 7111.

In the meantime, the big 2500 model has enough surprises.

The idea of four expansion slots — suitable for plugging in memory extension cards, hard disk cards, local networks, and so on — is to make the Amiga happy about sharing a world with the IBM PC.

To make the slots 'come alive' however, you need to make the machine compatible. To do this involves buying a plug-in IBM PC card, including 512k of memory.

Both the 2500 and this card were designed in Commodore's offices in Germany, and neither has a price yet. Theoretically, the plug-in card should cost very little indeed to produce, and could be sold for a price of around $US200 — theoretically. Also theoretically, the whole system including a hard disk could be sold for under $US2000.

At that price, with built-in IBM compatibility (just add a 5.25in diskette, at $US100 and the IBM card for $US200), the machine would be pretty irresistible.

Not all the people at the conference were totally convinced that the future will unroll in that irresistible way, however.

For a start, Commodore's history on pricing policy suggests that the new machine will probably be offered for around $5000.

Next, there is the question of how stable the company is. Commodore says it is doing very well, thank you, with losses down, turnover up, and all signs strong, fewer managers, and an advertising budget, and Gail Wellington, strong honcho in charge of the Amiga's software program, moved from Maidenhead to Westchester in America.

Exactly what Commodore's bankers think is not a question to which I can get an 'on the record' quote as an answer. Commodore's approach: 'They must think we're OK, or they wouldn't continue to back us'. Well, that's true, but the logic doesn't tell us yet whether Commodore's bankers will, after all, continue to back the company. This time next year, we'll all know what the answer would have been, but for now, you believe whosoever you want.

Fans of the Amiga say they don't care. 'Jack Tramiel at Atari badly wants to buy Commodore, the company he originally started up. He urgently needs to give Irving Gould (the man who fired him from Commodore) the sack and so the Amiga is safe, one way or the other'.

It sounds water-tight, doesn't it?

The trouble is that Tramiel has been indulging in an expensive lawsuit, attempting to prove that the Amiga's special-purpose chips actually belong to Atari, who commissioned the early developments. It is thought by most of those who speak to him, however, that he doesn't really want the Amiga, or its chips.

What he really wants, they say, are the next chips in the Amiga series, which he can plug into his ST range.

The question which this theory answers is: Why on earth would Jack Tramiel want two, incompatible, ranges of 68000-based computers — Amiga and Atari? The answer is: he doesn't. He'll kill off the Amiga, and plug the next-generation chips (they say) into the next Atari ST.

So, there are no certainties; which is where we came in, isn't it?

Bits and pieces for the Amiga

The one thing which everyone expected about the Ranger Amiga, the A2500, was a Motorola 68020 32-bit chip.

The one thing no-one expected was a new bus standard, using 100 pins instead of 86, and code named Zorro. So much for expectations and disappointment: at least the new bus works with the 68020 in its expanded form.

That chip is available, in a variety of add-on forms, from several people who showed their wares at the Monterey conference.

Biggest and most ambitious was the Turbo-Amiga launch from CSA, Computer System Associates of San Diego. This company also had inside information — details of the new bus standard using 100 pins — which others at the show felt was a surprise. They also felt it shouldn't have been a surprise.

The CSA add-on is a crate that stands next to the Amiga, effectively using the Amiga simply as a display terminal. Because it has its own 32-bit memory, and up to 8Mbytes of it, it can run a very great deal faster than the internal 68000 processor.

According to CSA, the box runs 120 per cent faster if you do no more than use the 68020. Adding 512k of 32-bit memory makes it 280 per cent faster. And running a well-known graphics test, the Mandelbrot display, takes less than three minutes — compared with 50 minutes on the standard Amiga — which in its turn is a pretty fast Mandelbrot processor. A standard IBM PC would take around 24 hours to do the same test.

From ASDG, two expansion chassis do much the same job, but one uses the old 86-pin bus, and the new one uses Zorro. Only hints of an add-on 68020, however, and no date. Lots of cheap memory.

To run 68020 code, you need a different assembler — OK, you don't need it to write programs, but you do if you want to use the new extended instructions and facilities provided in the bigger processor. From Quelo Inc, there was a 68020 assembler — native and cross assembler, for Amiga, and PC micros.

Other new items to attract the eye at the Monterey conference included a software package to drive laser printers.

JetSet is available for a number of lasers, including HP LaserJet, and is supposed to allow creation of files for transfer to MS-DOS computers that use the HP printer. The company is C Limited, which also does hard disk and SCSI controllers for it.

Printing what you see on the screen is something everybody wants to do at some time; so I thought Grabbit was neat, at $US30. The trick of dumping what you see on an Amiga screen is much harder than on normal micros, because there are several processors grinding away all the time, creating the image. That's from Discovery Software.

The Amiga software which holds out the most interesting promise is the Maxisoft series, which is still dragging through developments. Electronic Arts is supposed to be publishing it, but it is holding back on the grounds that the program is full of bugs. Mike Lehman, who is writing the stuff, retorts that if EA had come across with a little funding for the project, he could hire someone to debug it! In the meantime, he's set up Intuitive Technologies, with three products.

The one I liked was Encore, which repeats mouse movements. You set it up to record what you do with your hand — it might be a picture drawing sequence, or a series of pull-downs and menus. Then it plays back exactly what you did, whenever you like. For example, you can write something in a big fat pen, and then redraw it in a thin one, providing shadowing . . . and so on.

The claim made for this CompuSonics package, PC/MovieMaker, is that it allows users to record and play back video and audio on the IBM personal computer. With a high-performance disk, the company says, you can get 30 frames per second and high-fidelity sound, from video cameras, video tape, and other sources.

On top of that, it says that it has integrated R:base 5000 (now sold through Microsoft) and the Easy Trieve user interface, so that you can catalogue and selectively retrieve all recorded material.

The system isn't complete yet, but details are available in the States on (415) 494 1184.

Firebird moves into new terrain

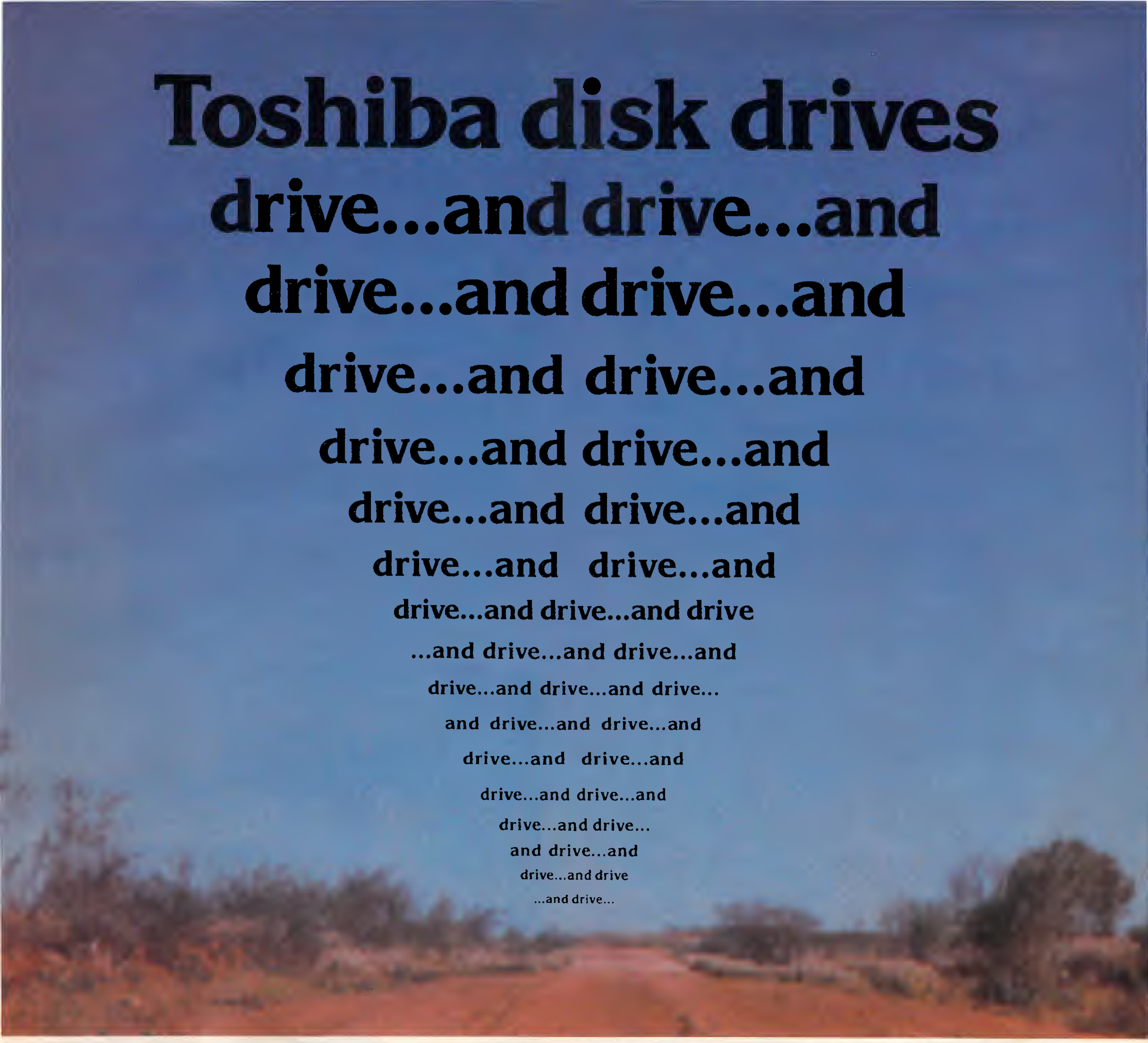
The software produced by Firebird is games sofware — up until Comdex, when Firebird Licensees Inc (FLI) showed a desktop publishing program called Laser Quill, plus several expert systems shells.

I couldn't find FLI in Las Vegas, However, people who have seen Laser Quill speak very highly of it, and at $US200 on the Macintosh, I can see why.

It is described in the *WYS/WYG* newsletter as 'a combination desktop publishing, page-layout and word-processing package, which can work with up to four documents of up to 698 pages in length at a time.'

For details, contact the American subsidiary, where Marten Davis, the president, is on (201) 920 7527 or (201) 444 5700.

The expert system packages are unique: the technology editor of *Punch,* Michael Bywater, believes that expert systems are 'an obvious vehicle for publishing'.



Toshiba disk drives drive...and drive...and drive...and drive...and drive...and drive...and drive...and drive...and drive...and drive...and drive...and drive...and drive...and drive...and drive ...and drive...and drive...and drive...and drive...and drive... and drive...and drive...and drive...and drive...and drive...and drive...and drive... and drive...and drive...and drive ...and drive...

Hard disk drives open up a whole new dimension in data storage and retrieval.

But for them to provide the sort of service most people are looking for, hard disk drives need to keep on performing, day in and day out. Month after month, year after year.

Toshiba disk drives do just that.

With Toshiba disk drives, there are fewer of those continuous, niggling problems that cost you money, because Toshiba hard disk drives virtually eliminate the drive as a system failure factor.

Toshiba hard disk drives. Like all Toshiba products, one less thing to go wrong.

There is a full range of Toshiba hard disk drives in both 5¼-inch and 8-inch formats, suitable for most computer systems.

MK-50 SERIES 5¼-inch Fixed Disk Drives:
86 Mbytes capacity. Up to 130 Mbytes with RLL Controllers. 25ms Average Random Access Time (FB Models). Industry standard size and mounting. ST506 interface. 20,000 hours MTBF. Centre stack Dedicated Servo surface.

MK-150 SERIES 5¼-inch Fixed Disk Drives:
173 Mbytes capacity. Choice of ESDI or SCSI interface. 25ms Average Random Access Time. Industry standard size and mounting. 30,000 hours MTBF. Centre stack Dedicated Servo surface.

MK-180 SERIES 8-inch Fixed Disk Drives:
Compact design and 166 Mbytes capacity. SMD interface. 18ms Average Access Time. Maximum reliability with VLSI Implementation. Automatic Spindle Brake and Carriage lock. Power sequence capability. Built-in diagnostics.

MK-280 SERIES 8-inch Fixed Disk Drives:
Compact design, 374 or 510 Mbytes capacity. 2.4 Mbyte/sec Data Transfer Rate (HSMD). 18ms Average Access Time. Maximum reliability with VLSI Implementation. Automatic Spindle Brake and Carriage Lock. Power sequence capability. Built-in diagnostics.

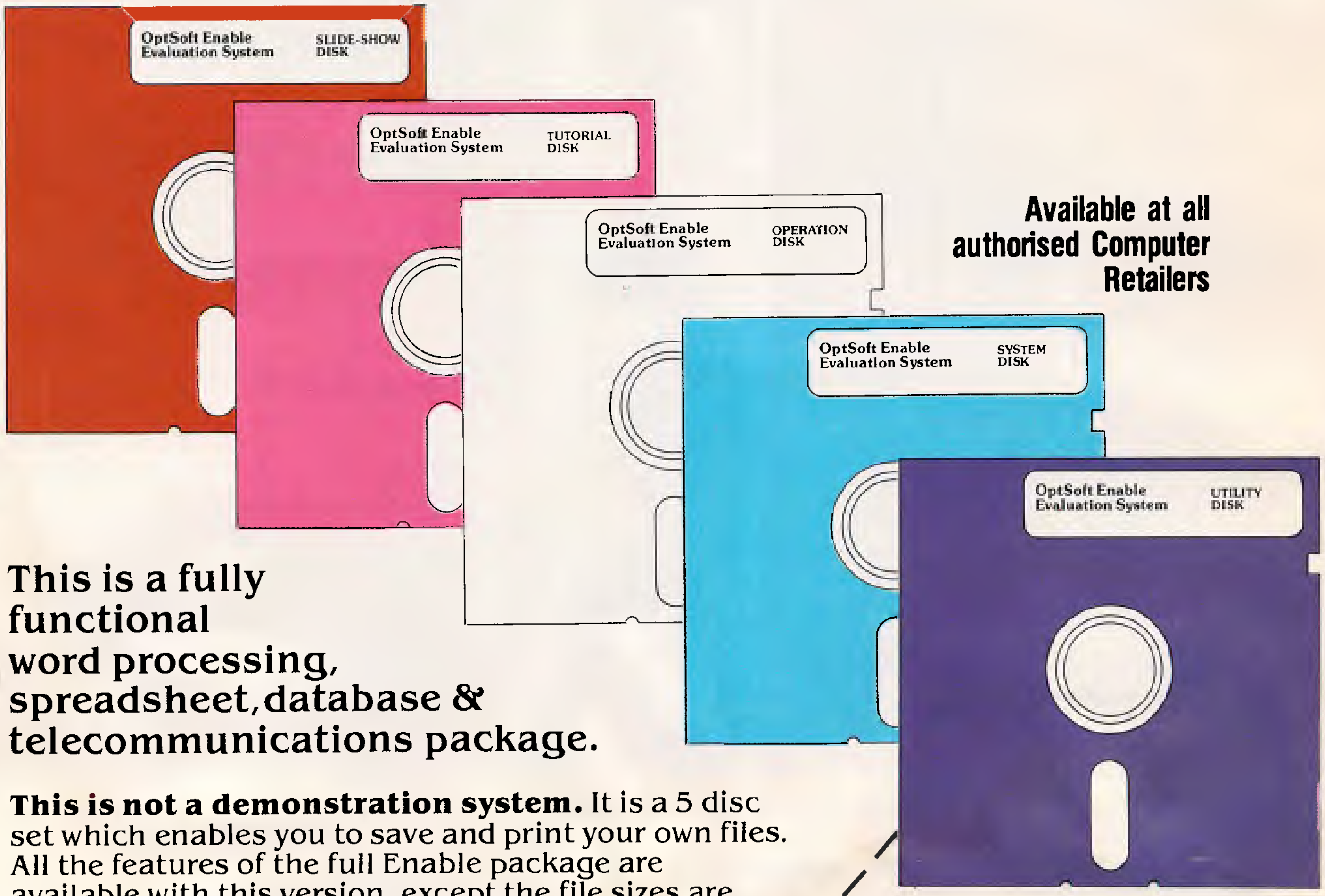
TOSHIBA

ONE LESS THING TO GO WRONG.

84-92 Talavera Road, North Ryde 2113.
Sydney (02) 887 6081 Melbourne (03) 877 6144
Brisbane (07) 352 9880 Canberra (062) 80 5100

CC/TCP0153

For just $49.95 OptSoft can introduce you to the world of integrated software.


OptSoft Enable Evaluation System SLIDE-SHOW DISK
OptSoft Enable Evaluation System TUTORIAL DISK
OptSoft Enable Evaluation System OPERATION DISK
OptSoft Enable Evaluation System SYSTEM DISK
OptSoft Enable Evaluation System UTILITY DISK

Available at all authorised Computer Retailers

This is a fully functional word processing, spreadsheet, database & telecommunications package.

This is not a demonstration system. It is a 5 disc set which enables you to save and print your own files. All the features of the full Enable package are available with this version, except the file sizes are limited — 10 pages per document in Word Processing, a matrix of 50 rows by 50 cells in Spreadsheet, and 50 records per Database.

'Taken as a whole, Enable surpasses the functionality of Symphony, Framework, Aura and Open Access.'
IBM PC UPDATE, Dec 1984.

enable™
integration without compromise

Distributed in Australia by
OPTSOFT PTY. LIMITED,
261 Old Northern Road, Castle Hill, NSW, 2154.
(02) 680 3930. International 61 2680 3930.

To: OPTSOFT PTY. LIMITED,
261 Old Northern Road,
Castle Hill, NSW, 2154

Yes, I wish to discover the world of integrated software. Please tell me the name and address of my nearest authorised OptSoft dealer.

NAME: ______________________
COMPANY: ______________________
POSITION: ______________________
ADDRESS: ______________________
______________________ P'CODE ______________
TEL: Bus ______________ Private ______________

He's feeding travel information into them, producing the first of 'The Advisor' — packages which you can chat with about where you are, and what you want to do, and what you like doing, and get a recommendation that you don't eat out in this town, but try an all-night disco on 34th street...

Other Advisors will handle insurance, house selling, and so on.

Far from logical

The most fascinating demo at the show, however, was the silliest.

Flight Simulator, written by SubLogic and sold to Microsoft, is available on the Amiga with a difference. This is that two Amigas can talk to each other down a serial line, and the two players can actually see each other on their screens. Eventually, they'll be able to have dogfights.

That's obvious enough. What struck me as absurd was the demonstration SubLogic had chosen for this.

The operator had put three Amigas side by side. The central machine was running the main program. The sidelined machines were running in slave mode, displaying the same position and attitude of the aircraft, but using a different view. The machine on the left showed the three-quarters forward view West, and the one on the right, the East.

The effect was very convincing. No-one is ever going to buy three Amigas to run Flight Simulator in 3D mode, of course, but it's interesting to know that it works if you want it.

Aiming too high?

The most amazing colour display I have seen so far is a totally flat-fronted Zenith box, running at 31KHz scan rate.

The salesman at Comdex stood proudly by it (as well he might) and said: 'This is not for sale to anyone except Zenith Data Systems, our computer subsidiary'.

The top righ-hand corner of this very, very high-resolution display was a little bit fuzzy.

Suspicious, I checked with other people in the colour monitor business; and yes, Zenith is having slight problems in producing this miraculous device for general consumption. 'It's not that they won't sell it,' said one rival manufacturer (who is in deep negotiations to buy it), 'it's that they still can't make enough of them to sell'.

When the company does, things will be fine. The product will probably work with whatever video standard IBM chooses for its next two machines, too. But since no-one knows what those are, yet, we might as well ignore that aspect of things.

80386 machines hit the market

In no particular order, the people who announced 80386 machines at Comdex included: Kaypro, Mad, GoldStar of Korea, Zenith, American Computer and Peripheral (AC&P), Applied Reasoning, and Blue Chip (a threat).

There were others who showed machines but didn't announce them (an important distinction to marketing minds) including PCs Limited. PCs Limited produced a machine which it says will run at 24MHz, when the 80386 will — using fast interleaved static memory to do this. It should maintain the company's reputation for low cost, using only 30 chips on the motherboard (compared to 175 on an Intel system motherboard).

I mention this because the company showed a 16MHz 80286 machine, which considerably undercuts the 80386 systems on price.

Applied Reasoning followed the example of Intel itself, the company which designed and builds the 80386. It offered a board to plug into your ordinary PC.

This one was unique, says Applied Reasoning. Most 80386 go-faster boards fit into an AT, which has a 16-bit bus. The PC elevaTor 386, however, will work in the standard 8088-driven PC or XT. More important still, the company claims, it will work in 8086-based clones — for example, the Olivetti, or the Amstrad. At $US2000, it might be worth a call on (617) 492 0700.

The Korean company GoldStar frightened a few people, with the GS-PC 386, because the company is known for its ability to undercut American producers' prices. But the company didn't quote prices at Comdex.

Mad didn't quote exciting prices; instead, it described its 80386 as a high-performance workstation, and sold it as an artificial intelligence box. This is jargon for 'not low priced at all'.

Zenith showed a machine which wasn't ready. The company admitted this, and promised the box for early this year. Kaypro, by contrast, introduced three 80386 systems which aren't ready, and didn't mention this fact except as a sneaky little comment at the bottom of paragraph three.

Kaypro, amazingly, has produced an 'entry level' unit in its Kaypro 386 model A. It includes a 1.2Mbyte floppy disk, no hard disk (but a controller board ready for one) and 512k of RAM.

No, it wasn't fascinating, was it?

IBM is known to be working on the 80386 chip — but was virtually the only

FULLY IBM PC/XT COMPATIBLE
GREEN OR AMBER TTL MONITOR

HIGH RESOLUTION (1,000 Lines)

$259
TAX INCLUDED

UNI-X Pty Ltd
16-20 Edmondstone St.,
NEWMARKET QLD 4051
Phone (07) 356 7866 Fax (07) 356 8086
*IBM, PC, XT are registered trademarks of International Business Machines Corp.

basic time PC/XT FOR LESS THAN $3,400!!

```
Disk Usage
2 Hidden files
55 User files
19963904 bytes left
761856 bytes used
21225472 bytes total
Memory Usage
579760 bytes left
75600 bytes used
655360 bytes total
Today Is
Tuesday the 1st
1:21:00am
Qubie' - Camarillo, Ca.        ** Licensed by Bourbaki, Inc. (c) 1984, 1985
```

OPENING SPECIAL PC/XT

SYSTEM INCLUDES

	RRP
PC/XT WITH 640K and including	
MS/DOS 3.1V & 1 DIR FILE MANAGEMENT	$1,799.00
HR31/200 COLOUR MONITOR	$ 799.00
COLOUR GRAPHICS CARD	$ 275.00
20MB HARD DISC INSTALLED	$1,599.00
KEYBOARD	$ 250.00
1 SERIAL - 1 PARALLEL PORT	
TURBO/4.77 SWITCHABLE	
TOTAL:	$4,722.00
SPECIAL OPENING PRICE (INC TAX)	$3,399.00

HILL'S NATIONAL SERVICE AVAILABLE

basic time

20 PARKES STREET
PARRAMATTA 2150
TELEPHONE (02) 635 8877

STORE BUSINESS HOURS:
MON - FRI 9am - 5pm, THURS TO 8pm
SAT 9am - 1pm

CREDIT CARDS: MASTERCARD - BANKCARD
MAIL ORDERS WELCOME - PHONE FOR DETAILS

WE ALSO STOCK: MONITORS, KEYBOARDS, GRAPHIC CARDS, HARD DISCS, MULTIFUNCTION CARDS, PRINTERS etc.

company not showing a system with it, at Comdex.

And there was even the start of a race for producing operating software for the machine, with enterprising firms taking advantage of IBM and Microsoft's delay.

Laser Digital showed a Pacer-386 model, remarkable for having its own 22-bit expansion bus — and having two of them.

That system will cost $US5500 with a 32Mbyte hard drive, and start shipping later this month.

Multitech has a model 1100 for $US4000 with a 40-Mbyte drive, but no innovative bus.

Biggest splash on the software side was from Phoenix, which has sold its 386 operating system to Microsoft.

The plan is to allow PC-compatible packages to run without modification as tasks under Xenix on 80386-based computers, under Phoenix's VP/ix. The big surprise here was for those of us who previously believed Microsoft's assurances that this would happen anyway.

The Software Link of Atlanta announced 'a single user, fully multi-tasking version of PC-MOS/386' for $US195. The normal version does multi-user operations: there are now two multi-user formats, one for five, the other for 25 users.

IBC (Integrated Business Computers) showed its Ensign 386:10 running another operating system, Theos Excitement over this was pretty muted, however, since the software isn't a 386 implementation, but runs on the 80286 AT family as well.

Frankly, when all these have proper graphics support, I'll start taking serious note of them. At the moment, Digital Research has a better change than any of them despite my reservations about GEM, and Microsoft Windows virtually requires a 386 chip, so it will probably appear in droves on those machines, just as soon as IBM presses the button. Where are the real innovators?

Chairman of the board

All you need is another five modems, and five serial ports, and your IBM family micro will be a six-user bulletin board. The software to do it is called Chairman.

In America, where this software was developed, the cost of six modems of $US150 each (or less) is roughly the cost of one modem in Australia. In America, they probably think the price of $US995 is quite high: here, by comparison with the hardware, it will probably look ridiculously cheap.

The software handles advanced features such as software downloading, binary files and electronic mail. Full details of how you arrange to cope with V23 modems (Viatel standard running at 1200/75 bits per second) are available from Dynamic Microprocessor Associates, in New York on (212) 687 7115.

Datavue steals the show

Most people won't design a minicomputer that will run the 8086 instructions set for one of two reasons: either they can't design a minicomputer, or, they can, and they have a much better idea of what it ought to do.

Datavue, a sister company to Quadram, has found a man called Vic Bennett who slips between these two rules. He knows it's a daft thing to do, but he also has worked out that there are several people who'd like an 8086 running at minicomputer speeds. And for his next trick, he proposes to build an 80386 running at minicomputer speeds.

Minicomputer speeds, for the Datavue Technical Systems 86150, means a clock of 150MHz. This gives him about 12 million instructions per second, which he reckons is three times as fast as a Sun workstation, and measured on the Norton's Utilities speed checker, 70 times the speed of a standard PC.

This is the slow version, however. The machine comes on two large boards, and fits underneath your normal AT box. It has its own 512k of fast memory.

But next year, he says, he'll have all this down to nine VLSI chips, using ECL (emitter coupled logic) technology. It will go at least twice as fast then. And very shortly after that, he'll have the 80386 emulator, which (because of wider buses and nicer instructions) will go at least twice as fast again.

The current machine costs $US10,000 and is about to go into beta test with a few American enthusiasts. Most of them are Autocad users, most of the rest are dBaseIII users — all of whom have complex jobs on their PCs, which take 24 hours or so to run. In a year's time it will take them around 10 minutes.

And 'this time next year', said Bennett, 'the price will be quite noticeably down, too'.

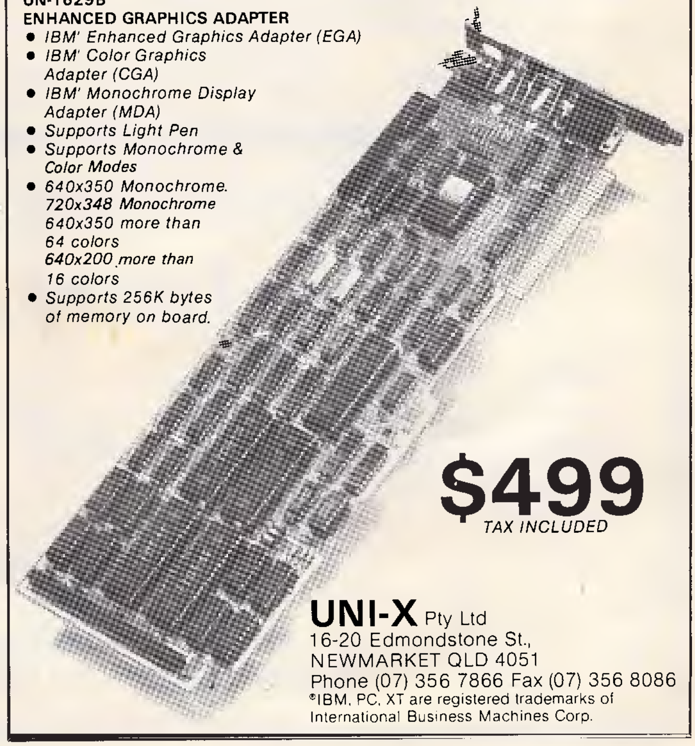
Details from Joe Maroney at Datavue in the US, on (404) 564 5780.

Guy Kewney

Window on the world

Bill Gates of Microsoft was given a special award recently for the 'Most Influential Individual Of The Year'.

How I hate award ceremonies! How foolish they are, and more important,



ENHANCED GRAPHICS ADAPTER

UN-1629B
ENHANCED GRAPHICS ADAPTER

- *IBM' Enhanced Graphics Adapter (EGA)*
- *IBM' Color Graphics Adapter (CGA)*
- *IBM' Monochrome Display Adapter (MDA)*
- *Supports Light Pen*
- *Supports Monochrome & Color Modes*
- *640x350 Monochrome. 720x348 Monochrome 640x350 more than 64 colors 640x200 more than 16 colors*
- *Supports 256K bytes of memory on board.*

$499
TAX INCLUDED

UNI-X Pty Ltd
16-20 Edmondstone St.,
NEWMARKET QLD 4051
Phone (07) 356 7866 Fax (07) 356 8086
®IBM, PC, XT are registered trademarks of
International Business Machines Corp.

how unerringly they seem to signal a change in the fortunes of the person receiving the award.

And usually, how misdirected they are, too. If ever there was a time to seriously cast doubts on the future influence of Bill Gates, head of Microsoft, prime purveyor of MS-DOS, and attempting purveyor of Microsoft Windows, this must be that time.

I yield to no-one in my admiration of Bill Gates himself. His mind is keen, his analysis of the future is always accurate, and on top of that, he has managed to create a highly profitable software company which has gone public with its shares, and made a success of it.

But the basis of the award seems to have been that MS-DOS is more important than IBM, and Windows more important than whatever IBM comes up with.

Windows, for those who use Apples or Ataris, is an attempt to tame MS-DOS by giving an intuitive set of commands to the MS-DOS user, rather than the hard-to learn mnemonics that it uses today. Windows also provides several graphics and other modern 'hooks' for software designers to hand programs onto.

No-one seems to doubt that Windows is a good idea. No-one, that is, except IBM, which has definetely told Microsoft that it will *not* be adopting Windows as a standard on its next generation of hardware. (Of course, IBM *can* change its mind).

But even those who like the idea of Windows, can't agree on what it will be like on big, powerful chips like the Intel 80386.

Oh, the present version of Windows works well enough on the 80386. In fact, sevaral disillusioned people at Comdex took time out from whatever else they were doing, to suggest that it wouldn't work sensibly on anything slower — an exaggeration. Windows works acceptably on an 80286.

The problem that bothers insiders is: what version of Windows are we heading for — and when ?

What do you get for $US900 in the Australian modem market? A 1200 bits per second modem, possibly a 2400 bits per second modem, and nothing to dial into with it.

In the US, you can now get this US Robotics 9600 Courier. It runs at 9600 bits per second, works on standard voice-grade dial-up circuits, user MNP error correction, and (grind those teeth) there are dial-up packet switching nodes to which you can connect.

All the prediction merchants — market research people, presidents of big corporations and writers — are forecasting something called DOS 5.0, or alternatively, something called Advanced DOS 1, in March. And a multi-tasking version of Windows is due in 1987, too, and several people seem convinced that the two go together, and will be available before June.

Some people even seem to be betting their future product line on this.

John Walker, author of AutoCad, is an optimist. He believes in the SDI, Star Wars. On Windows multi-tasking, he said: 'I've written three operating systems in my time, and not one of them was anywhere near ready on time. A multi-tasking operating system that emulates a previous operating system is asking the ultimate from a programming team. It will be late, if it works at all'.

From desktop publishing programs like Aldus PagerMaker II, Windows is essential. PageMaker II is an extraordinary piece of design, being a text-manipulation package that doesn't understand text entry. It doesn't have a way of accepting text from the keyboard.

How does the text get in there? You create it on a word processor, and cut-and-paste. To do that, of course, your word processor has to be running at the same time — using multi-tasking. Windows provides this feature.

Minitab & Lotus 1-2-3
Free Interface Program

SIROMATH Pty Ltd wishes to announce the release of the Minitab PC version 5.1 update. Minitab Data Analysis Software may be linked directly to Lotus 1-2-3 with a special interface program. This program is available FREE of charge to all purchasers of Minitab Standard or Lotus 1-2-3.

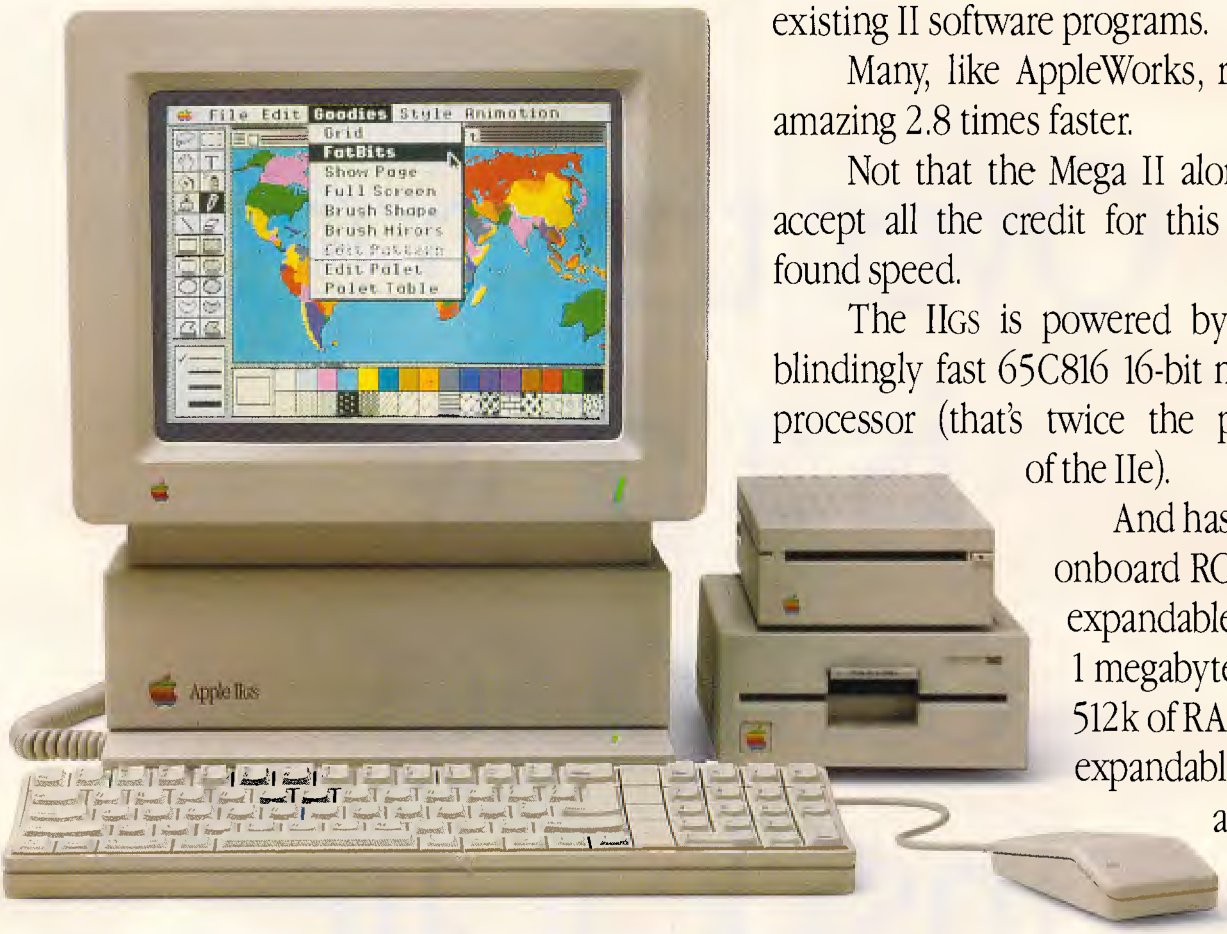
Siromath Pty Ltd

SYDNEY: 436 0500
MELBOURNE: 699 9777
PERTH: 386 8211
DARWIN: 84 5315

Over the page
is a new
computer.
Inside it are
two more.

AP320/Palace 1

The new Apple IIGS.



The new Apple IIGS features among other things, a built-in Apple IIe and IIc.

Both of these computers, or rather, their functions, have been built into the Mega II chip you see here (and that's its actual size, of course).

Two years in the making, you'll find the revolutionary Apple Mega II microchip alongside many other new custom chips on the IIGS motherboard.

We put it there for one simple reason.

Compatibility.

The IIGS runs virtually all of the 10,000 existing II software programs.

Many, like AppleWorks, run an amazing 2.8 times faster.

Not that the Mega II alone can accept all the credit for this new-found speed.

The IIGS is powered by a new, blindingly fast 65C816 16-bit microprocessor (that's twice the power of the IIe).

And has 128k of onboard ROM that's expandable to 1 megabyte. Plus 512k of RAM, expandable to a massive 8 megabytes.

Which means you can run the most advanced software without running out of memory.

The IIGS was partly named after its graphics, and no wonder.

The IIGS can create graphics as clear and sharp as the photographs you see in this magazine.

But with one major difference.

The range of colours.

The IIGS has 4,096 in all. From delicate violet to electric red.

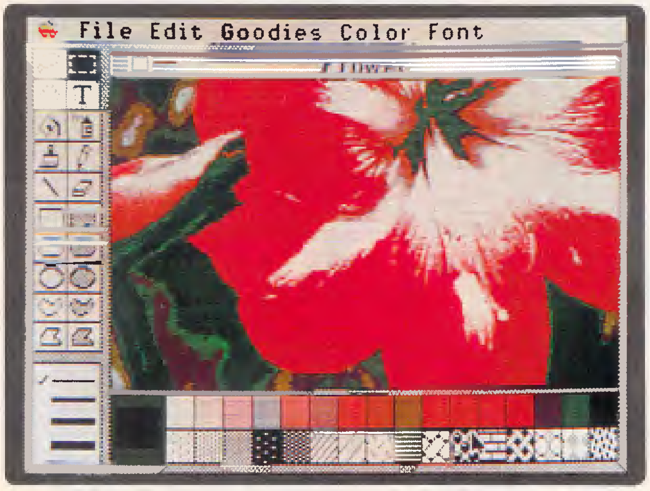
Any 256 can be used at a time in either of two graphic modes: 640 × 200 dots or 320 × 200 dots.

AP320 Palace 2

But you haven't heard anything yet. And we mean that literally.

The IIGS is so human, it even speaks.

The secret is a 32 channel Ensoniq sound chip, the kind you find in $40,000 sound synthesizers (who says Apples aren't value for money?).



It allows you to compose for and play up to 15 instruments at a time.

(Now you know where the other half of its name comes from.)

Naturally, with such high-fidelity sound, it makes sense to add the optional Bose RoomMate hi-fi speakers.

It also made sense to redesign the IIe keyboard to give you maximum freedom.

This one is detached, so you can move it all over your desk.

Or hold it in your lap.

And to make number crunching easier, there's a numeric keypad built in.

The Mouse, now standard, can be attached to either side of the keyboard.

(We didn't want to make left-handers feel left out.)

Also standard on the IIGS is MouseDesk. The software program that gives the IIGS its Macintosh-like interface.

So now, transferring ideas into action is as easy as clicking a button.

And while the IIGS is easy to use, it's just as easy to expand.

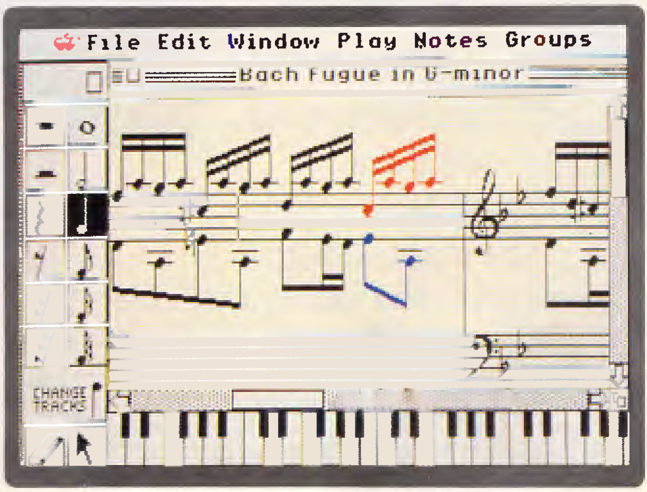
There are eight expansion ports at the back of the machine where you can plug in peripherals.

Anything from disk drives to modems, joysticks to printers.

You can share a LaserWriter with up to 30 other computers, thanks to AppleTalk, built into every IIGS.

Not only can you plug in a cord, you can plug in a card.

Take off the top of the IIGS and you'll find eight expansion slots where once again it's easy to make the IIGS smarter, faster or more powerful.



As improvements become available, you'll also be able to plug them in. So your IIGS will never become obsolete.

The new Apple IIGS.

It's even greater than the two computers inside it.

Apple

AP520/Palace 3

Take a stroll across a carpeted office floor. Then touch a wall, or a doorknob and . . . zap. The static charge you have built up in your hand can exceed 1500 volts.

STATIC RUINS DATA...

Whatever you do, don't touch an ordinary floppy disk.

The static charge can penetrate the liner and cause irretrievable loss of your data.

The static problem with floppy disks isn't limited to the sparks you can see and feel.

Even microburst, invisible to the eye, and too fast to feel, can cause data loss or 'blips' in the data.

There is now *one* floppy disk which guarantees to stop static-caused data loss.

Verbatim DataLife disks now have a patented liner called DataHold, which disperses static charges before they have the chance to reach your valuable data.

These are the disks that are also certified 100% error free, and guaranteed to store and retrieve your data for at least a human lifetime.

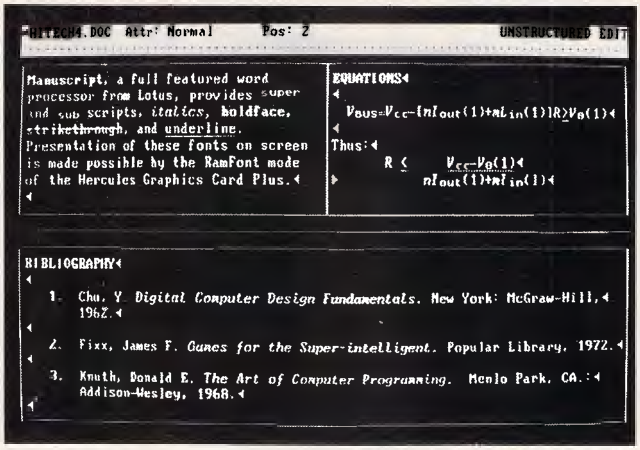
If you don't want any static, there's only *one* floppy disk brand to choose.

NOW WITH DataHold ANTI-STATIC UNSURPASSED DATA PROTECTION

Verbatim®
Word perfect. For life.

Now available from: **NEW SOUTH WALES:** Computer Resources Co. (02) 516 4099. Computer Supplies (Aust.) Pty. Ltd. (02) 439 5533. N.T.T. Supplies (Australia) (02) 357 5522. Twinlock Acco (02) 698 7288. **CANBERRA:** Computer Resources Co. (062) 80 6748. **VICTORIA:** Barries Office Supplies (03) 329 6500. Computer Resources Company (03) 543 5633. Computer Supplies (Aust.) Pty. Ltd. (03) 241 1071. Dataparts Pty. Ltd. (058) 21 7155. Twinlock Acco (03) 544 4000. **QUEENSLAND:** Computer Resources Company (07) 393 0288. Graphic Data Pty. Ltd. (07) 852 1877. N.T.T. Supplies (Australia) (07) 52 7333. Twinlock Acco (07) 52 4806. **SOUTH AUSTRALIA:** Computer Resources Company (08) 363 1133. Excel Computer Supplies Pty. Ltd. (08) 363 0466. Qualitron Pty. Ltd. (08) 276 2566. **WESTERN AUSTRALIA:** Computer Resources Company (09) 381 9588. EDP Supply Company (09) 322 4699. Office Products International (W.A.) Pty. Ltd. (09) 361 7422.

VB110



```
HITECH4.DOC  Attr: Normal      Pos: 2                    UNSTRUCTURED EDIT

Manuscript, a full featured word       EQUATIONS◂
processor from Lotus, provides super   ◂
and sub scripts, italics, boldface,     Vous=Vcc-[nIout(1)+mLin(1)]R≥Vo(1)◂
~~strikethrough~~, and underline.           ◂
Presentation of these fonts on screen  Thus:◂
is made possible by the RamFont mode        R ≤     Vcc-Vo(1)◂
of the Hercules Graphics Card Plus.◂   ▸         nIout(1)+mIin(1)◂
◂

BIBLIOGRAPHY◂
◂
  1.  Chu, Y. Digital Computer Design Fundamentals. New York: McGraw-Hill,◂
      1962.◂
◂
  2.  Fixx, James F. Games for the Super-intelligent. Popular Library, 1972.◂
◂
  3.  Knuth, Donald E. The Art of Computer Programming.  Menlo Park, CA.:◂
      Addison-Wesley, 1968.◂
◂
```

A demonstration of Manuscript, the new 'document processing' system from Lotus, has been doing the rounds of the software distribution people. If the product works half as well as the demo looks, this one must be a winner.

The idea of 'document processing', as distinguished from word processing, is one which probably overlaps with many of the concepts people have about desktop publishing.

For Lotus, the aim is to give the author control of long, highly-structured and frequently-revised documents. For this purpose you need to be able to see the structure of the document (so an outline processor is essential); you need to be able to see how the document will look, page by page (so powerful print formatting and page preview tools have to be provided); and you need to be able to feed graphics and data into the document from other programs — without having to type them out first.

Guy Kewney

In the absence of a serious alternative to DOS and Windows, most people are announcing support for Windows.

Tony Bove and Cheryl Rhodes produce a desktop-published newsletter called *Desktop Publishing* in the US.

They describe this 'everybody votes for Windows' phenomenon unkindly, as 'The Windows Conspiracy'.

To quote the latest newsletter: 'Fifteen companies recently announced products to run under Windows, all of them for desktop publishing applications. The news came on the heels of a joint announcement from Hewlett-Packard, Aldus and Microsoft, to promote Windows-based desktop publishing.

'At the press conference and the 'Windows At Work' seminar, however, development work was still not completed — the publishing solution was still at least three, possibly six months away'.

The purpose of the 'conspiracy', said Bove and Rhodes, 'was to take sales away from Apple, which is doing very well these days. In August, according to Infocorp, 12 Mac, eight Apple IIe and eight Apple IIc computers were sold through retail channels for every nine PC XTs and ATs'.

That's through retail. IBM does sell an awful lot of machines direct to corporate buyers, so don't take out your calculator until you can get the rest of the picture. But even so, it does show that the IBM world has not got the total dominance of the market that Microsoft would have you believe.

Without Windows, of course, none of these desktop publishers can get a product to market, they say — which is odd.

Lotus has released Manuscript (see picture story). Despite a previous announcement that future products would use Windows, Manuscript doesn't. If Manuscript isn't a desktop publisher, then there is no such thing.

Xerox has released Ventura Publisher (reviewed in the next issue) which uses GEM as its graphics environment. It seems to work — no fulltime test done yet, but I've seen Digital Research using it under fire. Ashton-Tate is working on getting Skisoft's package out. That doesn't use Windows. FrontPage doesn't use Windows.

More to the point, you can use these products on existing IBM PCs and XTs, and equivalent clones. You don't need the 80286 chip — which you certainly do need for Windows.

So, is Windows in a position to compete, yet? Bove and Rhodes think not. At the Microsoft seminar, they noted, AB Dick admitted that the product on display was not complete, nor was the Windows interface.

Xerox was there, with Ventura, under the banner of 'We will support Windows'. But Bove and Rhodes note, sceptically that this is just a statement of intent — not a single line of code for that project has yet been started.

Windows has a lot going for it, if it ever meets the design specs.

In theory, at least, I don't mind giving up some processor power to the job of making the system easy to use. Multi-tasking is a goal which will give amazing rewards to the users, and amazing riches to the first competitor to reach it.

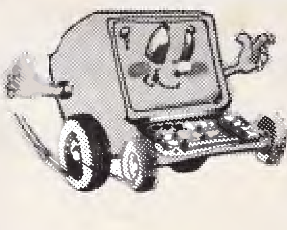
But two things have to be said about Windows multi-tasking. First of all, it isn't ready. And secondly, there is strong evidence that IBM has turned it down, flat, as a product for its own new products. Instead, it wants to sell us a graphics-enhanced version of Top View.

I think this is mad, crazy, sick, and suicidal, but I can't honestly suggest that Windows is a certain enough development that IBM should seriously consider it as an alternative.

For 1988, perhaps. For 1987? I really think there's an opportunity for someone else to step into the gap.

Guy Kewney.

END



THE NEW DAPro® DPS RANGE OF COMPUTER POWER SUPPLIES MAKES YOUR COMPUTER REALLY PORTABLE!

Take it anywhere, then just plug it into your Car Cigarette Lighter or 12V Battery

- 4 models.
- New technique to develop perfectly regulated output.
- Provides complete monitoring of input voltage.
- Comes with extra long 5 meter output cable.
- Completely designed and made in Australia.

DAPro® Electronics

P.O. Box 40 (3 Wilga St.,)
Concord West, N.S.W. 2138

IBM XT 286

While surely never hoping to repeat the immortality IBM has achieved with the PC, the company continues to produce machines which seemingly serve as stopgaps before it sets the next standard. The XT 286 is either that, or a rather hurried attempt to sound the death-knell for the 8088 processor. Peter Jackson sounds out IBM's latest, due to be announced in Australia early this year.

When IBM announced this machine in September last year, commentators found it hard to see a purpose for an 80286-based machine, competitive with the AT but in a PC box, unless it was the first sign that the ancient regime of the 8088-based IBM PC was coming to an end. And even then, the XT 286 was not the much-rumoured cheap clone-killer, or the dynamite-priced new AT, or even the new IBM 386 machine that is already appearing, we hear, in corporate beta test sites. Comments ranged from 'a stopgap measure', through 'the end of the 6MHz AT', to 'I don't get the point of this machine.'

But as the first non-AT PC to emerge from IBM since the less-than-dramatic announcement of half-height floppies and a 20Mbyte winchester for the XT the XT 286 deserves consideration. It could be the pall-bearer for the 8088, and the future standard PC in the IBM line — and then again it might not. Let's take a look and see.

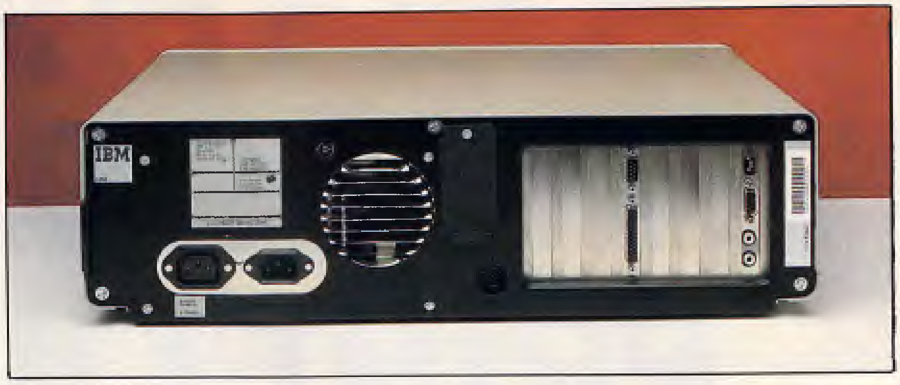
Hardware

The initial IBM PC design in 1981 has become something of a classic, at least externally. It may look nothing more than a big square box that is too high to stand a monitor on, but in fact IBM was limited by the design philosophy it had chosen. It wanted a machine that had space for at least one floppy disk drive, and preferably two, since the floppy drives of the day only held not much more than 100k.

These floppy drives were full-height, since there was nothing else around then, and putting two of them side by side set the minimum width and height of the box. The depth of the drives with a shielded power supply box behind them governed the depth of the external case, and the decision to include Apple II style expansion slots — the single greatest contribution to the PC's success — meant that they had to go to one side of this floppy/power supply block. With the depth and height of the case fixed, the maximum size of the expansion boards was automatically fixed at the dimensions that are so familiar today.

The result was the system unit that forms part of the three-box set-up which is now typical, but was very rare indeed in 1981 when keyboards were built into the computers or all the work was done at the terminals. Mark my words, the PC system will get a design award after the machine itself is dead.

The XT 286 system unit uses the absolutely standard PC case, all in grey and beige sheet steel, with the normal two full-height disk drive holes and ventilation slots in the slanted front panel. All the dimensions are precisely the same, and the only concession to the new product is the new IBM name-and-type badge proclaiming that it is indeed a Personal Computer XT Model 286.



The eight expansion slots are low — PC height, not AT height

Removing the system unit case has a familiar feel to it; removing five screws from the back panel allows the case to slide off forwards and leave the chassis exposed.

As mentioned earlier, the general internal design of the PC has not changed over its five years of life, but the basic circuit design of the motherboard has been through a number of incarnations. First there was the original PC, with 16k RAM installed and sockets to take that up to 64k using 16k RAM chips, along with five 8-bit expansion slots, a home computer-style tape cassette interface(!) and Basic in ROM. Then came the XT, with up to 256k RAM on the main board thanks to 64k memory chips and eight 8-bit expansion slots of various lengths, a bit closer together than those on the PC. Then came the AT, with a completely new motherboard built around the 80286 processor, with 512k RAM on the board and a new combination of 8-bit and 16-bit lots. And then came the new XTs, with expansion to 640k RAM on the motherboard but otherwise just the same as the old ones.

Now the XT 286 adds to the list. The new motherboard fills the gap between the hefty metal casing of the power supply and the side of the chassis, overhung by the left-hand floppy drive. As usual, the half of the board furthest away from the front panel is dominated by the expansion slots; in this case there is yet another new combination of three 8-bit PC-style slots and five 16-bit AT-style slots. Two of the three 8-bit slots are short ones, behind the floppy drive, while the other is a long one at the extreme edge of the board.

The other obvious change from the old XT is the replacement of the 8088 processor chip by the big, square 68-pin block of the 8MHz 80286, right at the front of the board alongside the empty socket designed to take the 80287 maths co-processor that is now readily available off the shelf for $500 or so.

And apart from that, the board is a very peculiar object indeed. The memory area of the old XT, forward of the expansion slots, is now filled with a mish-mash of simple, standard, Advanced Low-power Schottky TTL chips surrounding the 80286. These chips, with numbers like 74ALS245 or 74ALS02, appear in all

The aggravating AT/E-style keyboard is a 'great leap backwards'

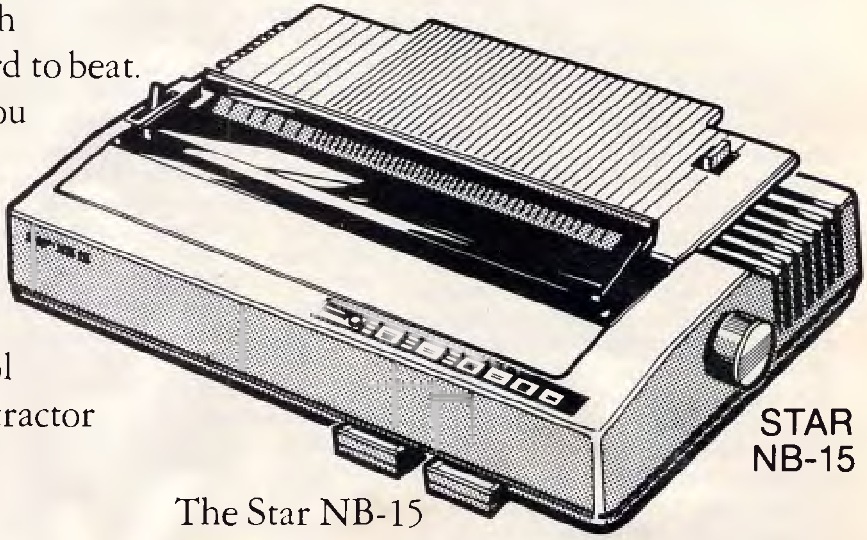
FOR 100cps LETTER QUALITY PRINT OUTS,

THIS IS THE STAR!!

If you want high quality, high speed printing, the NEW NB-15 15-inch printer from Star Micronics is hard to beat. In fact, it won't be beaten when you compare it to the competition.

For real value, you get all the features – 100cps Letter Quality and 300cps draft quality printing, a choice of typefaces, touch control operation, auto paper feed, push tractor feed, full IBM* compatibility and 12 month warranty.

Plus the unique print buffer — 16K of built-in memory that lets the computer get on with the computing. There're no delays so you save time and money.



The Star NB-15 is one the most competitively priced printers available — phone today for the location of your nearest Star dealer.

Unit 7, 25 George Street, Homebush, Sydney.
N.S.W. Australia. Area Code 2140.
Phone 736-1144 Telex AA 73872.
Melbourne call:
(03) 819 1050
*IBM is a registered trademark.

star
micronics

computer systems to do the housekeeping jobs around the board. They normally include just a few logic gates, or inverters, or level shifters, and tailor and manipulate the signals travelling around the computer's circuitry.

As there is a lot of signal-tidying to be done, there are normally a lot of these chips in an initial board design. But the big breakthrough in the last five years has come with custom and semi-custom gate array chips, often just called uncommitted logic arrays or ULAs. These are large chips with hundreds of logic gates on them, and the connections between these gates are not made until the last manufacturing stage. This means that chips can be tailored to do a specific set of logical jobs; and this in turn means that a single ULA can be customised to replace a large number of standard TTL chips and simplify board design. Hence, later models of computers tend to have their TTL chips changed into ULAs in order to get cheaper manufacture and higher profit margins.

But you would not guess from the XT 286 board that IBM had *heard* of ULAs, even though it has just done a deal with chip-maker Intel covering the technology. IBM is so good at custom and semi-custom chip design that Intel has handed over manufacturing and technology rights to its existing and future microprocessors, just to get hold of IBM's computer-aided chip design system and its standard custom chip library. It's painful to think it, but the XT 286 board looks like an early version that will be tidied up later, or something that has been put together by designers in a hurry.

One interesting incidental is that IBM seems to have already taken up its manufacturing options, since the 80286 in the review machine had an IBM manufacturing label rather than an Intel one.

The memory arrangement is a little strange, too. Gone are the neat rows of memory, each with nine chips instead of the more usual eight to allow parity error-checking, so familiar from the XT and the AT. On the new board there are two single inline packages (SIPs), each holding nine surface-mounted 256k RAM chips and providing 512k of RAM. Next to the new SIPs is an odd combination of two more 256k RAM chips in more conventional form, combined with four physically larger and more archaic 64k RAM chips. By my calculations, that gives the XT 286 a total of 672k of RAM, 640k of it for the user.

However, the combination of SIPs and a patchwork of conventional RAM chips in the XT 286 is not so easy to understand. In the absence of the IBM technical reference manuals for the machine memory architecture remains a mystery. The power-up RAM test of the machine, however — much speeded up over the one on the conventional PC or XT — showed 640k available.

The notion that the motherboard is a preliminary product is given futher weight by the use of EPROMs for the 64k of ROM on the motherboard, used mainly for the Basic Input/Output System (BIOS) and IBM ROM Basic. EPROMs, which can be erased using ultraviolet light and then reused, are normally used for prototyping software that will, in the end, be hard-wired into proper ROM chips where the software contents are fixed during manufacture.

As with the original XT, the only other major function on the motherboard is a real-time clock maintained by a trickle of power from a battery pack mounted in the back panel. The other necessary functions, like the display and input/output ports, are driven by plug-in cards.

The only plug-in card that automatically comes with the XT 286 is the disk controller board, since the minimum configuration of the machine comes from the factory with a 20Mbyte winchester drive and an AT-style 1.2Mbyte floppy drive. The controller board uses a Western Digital 1100 custom controller chip rather than the NEC chip on the original PC, and can handle combinations of both hard and floppy drives. It's a long board, and takes up one of the 16-bit slots in the machine; due to the positioning of the drives and their interface cables, it really has to go in the last of the 16-bit slots right next to the floppy drive.

The choice of display and input/output adaptors is up to the customer, who can either buy the (expensive) IBM products or go for third-party expansion boards from the dealer's shelves. The review machine came with an Enhanced Graphics Adaptor from AST Research, since the dealer had no stocks of the official IBM product, and with a board combining a standard IBM Centronics parallel port and a nine-pin RS232 port as provided on the AT. This second board had no maker's name on it, and was an unusual size; it would not fit in one of the short slots, since it was too long to go behind the floppy drive casing, and had to go in one of the 16-bit slots despite being an 8-bit board.

Handling the power requirements of the EGA card and the other sorts of expansion boards available today, not to mention the power-hungry 80286 itself, needs a beefy power supply. The XT 286 now comes with a 157W supply, as against the 130W of the original XT and the 63W of the original PC.

As briefly mentioned above, the standard

Technical specifications

Processor:	Intel 80286, 8MHz
RAM:	640k
ROM:	64k
Mass storage:	1.2Mbyte floppy drive, 20Mbyte hard disk
Display:	Monochrome, CGA and EGA adaptors and monitor
I/O:	Various adaptors available
Expansion slots:	One long and two short 8-bit slots; five long 16-bit slots
Keyboard:	IBM extended, 102 keys
Operating system:	PC-DOS 3.2
Bundled software:	None

In perspective

The XT 286 has to compete in the market not just with cheap AT clones offering more for less money, but with the host of cheap upgrade products like the Mountain Racecard or the Orchid Baby 286 that will give an existing XT an 80286 processor and all the advantages that the XT 286 does apart from the 20Mbyte winchester. And add-on hard disks for XTs are not hard to come by (cheaply).

The market for the XT 286 looks slender and temporary, and the reasons for launching it are obscurely hidden inside IBM's corporate structure. Of course, if the XT 286 suddenly becomes the base level of IBM's PC line, with a price cut to match, then this analysis fails; but the artificial crippling of the machine seems to point to a temporary niche product that will not have a long market life.

As always, time will tell. But when the AT is becoming the minimum standard thanks to the clone makers, the XT 286 looks less than enough.

configuration of the XT 286 includes a 20Mbyte hard disk and a 1.2Mbyte floppy drive. On the review machine the half-height floppy came from a large but unsung Japanese company, YE Data, while the full-height winchester was actually built by IBM Japan rather than brought in from an OEM. Perhaps IBM's unhappy experiences with the AT's initially flaky third-party hard disks have driven the company back to sourcing in-house.

The big surprise about the disk drives is not that the hard disk comes as standard — most users these days demand that — but that it's the same much-criticised hard disk used in the 8088-based XT. One drawback of the XT is its slow hard disk access — 85 milliseconds average — when its full-height winchester is compared with the fast half height 5¼in and 3½in drives now on the market, and even IBM acknowledged this when it went for the faster 35-millisecond drives for the AT range.

The decision to lumber the XT 286 with this slow drive, when the machine is fundamentally comparable with the AT Model 339 as far as its electronics are concerned, seems ridiculous when faster drives are available. It starts to seem criminal when the customer or dealer is not even given the option of installing a faster hard disk without first buying the slow one, and then, presumably, throwing it away or propping up a table leg with it.

The only explanation that makes sense is that IBM doesn't want the XT 286 to compete head-to-head with the AT Model 339, and has slugged the hard disk drive with enough of a performance difference to push the corporate power users up-market to the more expensive machine. Of course, it could just be that IBM Japan had a warehouse full of slow, full-height, four-platter drives that it needed to get rid of at cost . . .

Quizzed on this subject, an IBM spokesman in the US, with typical openness, said that the drive had been used and fitted as standard because IBM had designed the machine that way — end of story.

	IBM XT 286 BasicA	IBM PC BasicA
Intmath	1.9	6.2
Realmath	2.3	8.2
Triglog	8.3	47.0
Textscrn	59.7	100.0
Grafscrn	12.2	49.0
Store	2.8	12.8

The XT 286 used a 2Mbyte hard disk for store; the IBM PC used a standard IBM 360k floppy

All timings in seconds. For a full listing of the Benchmark programs, see End Zone.

The obvious use for the spare half-height floppy slow is to put a standard 5¼in, 360k drive in there, since the 1.2Mbyte drive, like that on the AT, can happily read 360k disks but has trouble writing them reliably. However, the option now exists to install an internal 3½in floppy drive for file transfers between the XT 286 and the IBM Convertible, the Data General One, the Toshiba 2100 and 3100 PC-clone and AT-clone lapheIds, the Atari ST, or any other machine that uses a standard 3½in format. The review machine was supplied with MS-DOS 3.2, whose main advantage over 3.1 is support for the smaller floppy size.

The XT 286 keyboard is the enhanced model introduced with the AT Model 339 and the half-height-floppy XTs earlier this year, which has had mixed reactions. IBM intends this keyboard to be standard across its entire range of products including mainframe terminals, all the PCs, and even the PC/RT RISC machine and some of the changes to the familiar PC layout have been made to increase compatibility with the keyboards used by hundreds of thousands of IBM mainframe terminal users worldwide.

Of course, these changes are also calculated to drive experienced PC users insane.

The most obvious differences are the new row of function keys along the top of the keyboard and the separate cursor and editing key groupings, which leave the numeric keypad free for fast number entry without any annoying switching to get back to cursor mode.

The function keys have not only been moved from their usual position at the left-hand of the keyboard — making thousands of application software function key templates obsolete overnight — but have also been increased in number to 12 for compatibility with mainframe terminals. Existing software that only uses 10 function keys will work fine, with keys 11 and 12 doing nothing, but will have to be re-written to take advantage of the extra two keys. It seems unlikely that publishers of existing software packages will bother.

The other changes to the keyboard are more subtle and thus more aggravating when they are found. The Escape key used so often in menu-driven applications is now off the main part of the keyboard altogether, and is positioned in a hard-to-hit place alongside the function key row as if it were Function Key 0.

Worse, the great leaps forward made with the IBM AT keyboard — the enlargement of the left Shift key to get rid of the extra key between Z and Shift, and the enlargement of the Return key to cut down the reach from the touch-typist's home keys — have been reversed. The backslash ('\') moves again from its useful position next to backspace to take up its old place between Z and Shift, and the Return key has been cut down to fit an extra hash ('#') key between the quote key and Return.

And worse still, IBM has made a great leap backwards by moving the Control key down below the left Shift key, and putting Caps Lock — of all things — where any sane computer user expects Control to be. Apparently, IBM typewriter users expect the Caps Lock to be above the Shift, and that is why the change has been made. Fine, fine. Of course, typewriter users don't need to use the myriad control key sequences in WordStar, to name just one package.

This is madness. The changes to the original PC keyboard demanded by touch-typing users have been changed back again for no apparent reason, and should cause the same anguished howls that went up when the PC was first released.

There will be less argument about the other changes. Those out-of-place system control keys at the top row of the numeric keypad have been moved up alongside the function keys, and the numeric keypad now has its own Enter key and a more logical arrangement of mathematical keys. And the shape of the board has been changed, with a distinctively mainframe terminal-like curve upwards at the top, to allow touch-typists to reach for the new row of function keys without too much stretching.

The 'enhanced' keyboard has kept the same clacky and positive feel as the original PC board, and feels like a heavy-duty product that will take a lot of pounding. But there's no chance of switching from the AT layout to the new one, simply because of the crazy recidivist changes to the design. If I hit Caps Lock one more time when trying to do a Control-U. . .

On the other hand, the Enhanced Graphics Adaptor and the Enhanced Colour Display monitor really do live up to their grandiose names. For those used to the muddy purple and horrible blue of the IBM Colour Graphics Adaptor, the bright shades and sharp edges of the EGA card and monitor will come as a revelation. Window-based applications like GEM suddenly become much more Macintosh-like — the EGA display has more resolution than a Macintosh, in 16 colours — and with an 80286 in charge, the performance is high enough to drive the display to advantage. It's no wonder that the EGA is becoming the new

AT LAST!

PAGEWORK

DESKTOP PUBLISHING FOR YOUR IBM PC

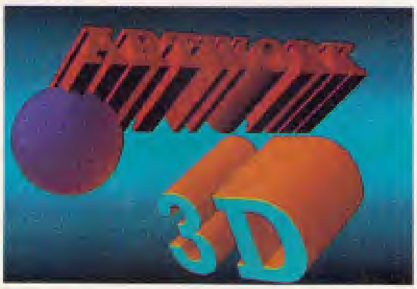
The only desktop publishing system that offers true WYSIWYG, colour and backup from one of the most comprehensive graphics environments available today.

Used to be, when you wanted to do desktop publishing on your PC, you had to get a MAC. **ENTER PAGEWORK.**

PAGEWORK is a powerful page make-up program that will allow you to create newsletters, technical documentation, advertising, or just about any page compositiion task quickly and easily.

PAGEWORK is a true WYSIWYG (what you see is what you get) system, which means that you will see exactly how your page will look, on the screen, BEFORE, you print it. Using any one of your favourite word processors, text is set into flowing columns wrapping around graphics.

PAGEWORK is unique because it is a member of the *Artwork* environment, a group of powerful integrated graphics programs.



The *Artwork* environment includes many powerful and unique features which incorporate high resolution colour, 3D drawings, photographs and existing art (yielding automatic half tones for printing), Business Charts and graphs (allowing data to be graphed from such programs as LOTUS 1-2-3). There are also a host of other support products which will import AUTOCAD and MIRAGE drawings.

All of these products make your PC based desktop publishing system running PAGEWORK flexible, easy to use and unbeatable value for your money.

Call us now for a demonstration.
(02) 957 6800 or (03) 699 9211
Minicomp Pty. Ltd.
104 Mount St.,
North Sydney, 2060.

Minicomp

standard, and with third-party board makers in the ring, the price is coming down fast. Users will soon demand it as they have demanded the full 640k of memory.

Compatibility

If anyone should know how to make an 80286 machine compatible with an 8088 machine, it's IBM. And the company seems to have done a good job with the aid of all that random TTL circuitry. The Thesys 2Mbyte Lotus-Intel-Microsoft expanded memory board went in and worked first time, as did the Mountain DriveCard plug-in 20Mbyte winchester (which is, incidentally, as slow as or slower than the XT 286's main drive).

All the software tested worked fine and quickly, including Smart, Side-Kick, Turbo Lightning, WordPerfect, Microsoft C, AutoCad, GEM and all its applications, and everything else. And all them looked much better with the EGA display.

In fact, the surprise would have been if any of them had failed to run. At the launch of the AT there were some packages that failed, but any software publisher worth its salt has new versions out that will work on any PC from the AT down, and that includes, by default and IBM's design, the XT 286.

The only potential problem is a physical one: the AT case is at least half an inch deeper than the XT 286's, and some AT-specific cards — AST's RAMpage springs to mind — just won't go in the XT 286 with the lid on.

It was fascinating to run, side by side, an 8088-based PC, the XT 286, and a 32-bit Compaq DeskPro 386, all running the same software with roughly the same performance gap between them. The XT 286 was roughly twice as fast, for most applications, as the PC, while the Compaq was twice as fast again. It was even more intriguing to run the Compaq 386 demo program — using lots of graphics and pushing the EGA to its limits — on the XT 286. The program ran perfectly on the smaller machine, albeit more slowly and more jerkily, and I'm not sure whether that is a credit to the compatibility work of Intel, IBM, Compaq, or all three.

System Software

The operating system provided was PC-DOS 3.2, the IBM-badged version of MS-DOS 3.2. There is little point in rehearsing the description of MS-DOS here, since so many users are deeply familiar with its ins and outs; and 3.2 adds little to 3.1 apart from 3½in disk support.

Price

In the US, the base price for the XT 286 system unit, including 640 k RAM, one floppy drive and one 20Mbyte hard disk drive is $US3995 (about $A6000 at press time), which is between a standard PC XT and the AT.

In Australia a 20Mbyte hard disk, 512k IBM PC XT sells for $5390 and a basic AT with this same configuration is $9330. So when IBM launches the XT 286 here, it will be somewhere between these two prices, (unless of course existing PC model prices are changed). Our guess would be that IBM will have to price it pretty much mid-way between the XT and the AT, at about $7500.

Conclusion

The XT 286 is, in itself, a good PC-compatible that no clone-maker would be ashamed of. Its performance is higher than the old 8088-based PC or XT, apart from the sluggish hard disk drive, and if the manufacturer were not IBM there would be no complaint.

However, since the manufacturer *is* IBM, there are other considerations. The XT 286 doesn't seem to fit properly into the PC line, squeezing its way in between the XT and the AT with difficulty as the AT price falls and the justification for buying a lower-performance PC diminishes.

As an AT in an XT box, the drawbacks of the XT 286 are the difficulties with AT-sized expansion boards and the compulsory purchase of an inferior hard disk drive. The advantages are harder to spot, apart from a price difference that begins to seem less important when the advantages in performance of the AT are considered.

If the XT 286 had been launched as the original XT, IBM would have had a winner on its hands. If the XT 286 is the replacement for the XT, with the AT going up-market to sit underneath the putative 80386-based 32-bit machine, then it would be adequate to the task.

But as it stands, the machine looks like a temporary measure that will not long survive the rash of new PC product introductions that IBM is readying for sometime in 1987, and that will not be able to handle the forthcoming dedicated 80286 operating systems adequately unless the memory architecture is less peculiar than it appears.

If you *must* buy IBM and an AT is out of reach, than the XT 286 would be a good choice to beef up the performance of a PC application. If you don't have to buy IBM, then the better course would be to buy an AT clone that would be cheaper than the XT 286 and would do the beefing up rather better.

And if that sounds like faint praise of the machine, it is. IBM is acting as though it has the only PC product line in the world, and as its market share and profit figures show, *that just ain't no longer so.*

END

dBASE PROGRAMMING

LOTUS 123 TURBO PASCAL
ENABLE ETC . . .
MULTI USER SYSTEMS

INEXPENSIVE PC COMPATIBLE HARDWARE AVAILABLE.

Proware P/L

DAVID YOUNGER
(02) 371 9800

WE PROVIDE A TOTAL SOLUTION

COMPUTER REPAIRS

Has your IBM-Apple compatible stopped working? We specialise in repairing power supplies, disk drives, motherboards and peripherals for most models.

COMPUTER & ELECTRONIC SERVICES PTY LTD

(03) 561 8947 BH WHEELERS HILL VICTORIA 3150 (03) 561 4683 AH

Dual Speed Now Available!!

Made in USA 1 year Warranty

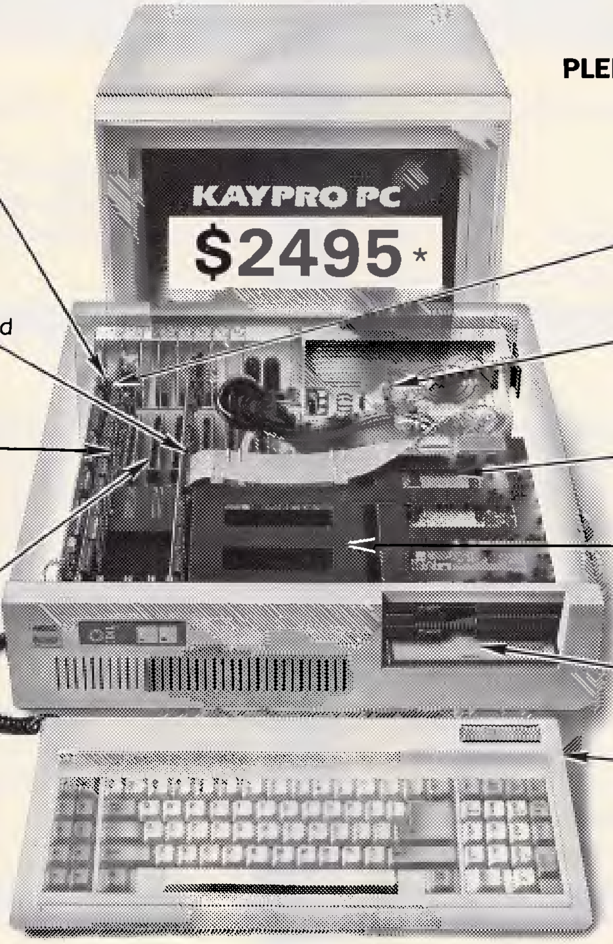
KAYPRO introduces NON-OBSOLESCENCE

NEXT YEAR'S TECHNOLOGY?
That's easy. Replace the existing IBM PC/XT board with an IBM PC AT-compatible board, available now; IBM 32-bit standard, available soon; or whatever the future holds.

MEMORY-HUNGRY SOFTWARE?
Simply exchange the existing multi-function board to 768k standard for any configuration of memory, I/O, and controller boards.

HIGH-RESOLUTION GRAPHICS?
KAYPRO's standard multivideo board features perfect monochrome clarity plus high-resolution color (IBM CGA). But, if it's IBM EGA that you want? – simply snap in a board.

FURTHER SYSTEM EXPANSION?
But of course! The KAYPRO PC is ready for anything. With six available slots, add what you need – networking, modems, more memory – the sky's the limit.



PLENTY OF STANDARD FEATURES?

DUAL SPEED:
Go from 4.77-8 MHz with just a flick of a switch!

POWER SUPPLY:
A generous 132 watts of power for even the most demanding hard drive.

FLOPPY DISK DRIVES:
Dual IBM-compatible floppy disk drives standard or slide in the drive of your choice.

HARD DRIVE EXPANSION:
Space provided for easy addition of internal hard drives.

BUNDLED SOFTWARE:
A full selection of business software for today and tomorrow.

KEYBOARD:
Detachable, IBM PC AT-style keyboard with security keylock.

Kaypro's new "Snap-In" technology lets you exchange or update all vital system components in seconds.

Computer technology changes with lightning speed. In the time it takes to read this, there will be dozens of new products on the market that make their predecessors obsolete. With that in mind, we'd like to give you a bit of good news. The fully IBM PC/XT compatible KAYPRO PC has been designed to eliminate computer obsolescence. That means it's a snap to update all vital system components – right down to the system's microprocessor. And, if it's topnotch features you want, look no further. The KAYPRO PC delivers: IBM PC AT-style keyboard, two disk drives, dual speed board, built-in color capability, and 768k of standard memory. The culmination of Kaypro's 33 years of electronics engineering innovation, the American-made KAYPRO PC just may be the last computer you'll ever need.

Price: **$2495**
$3295★ *(20 meg)*

For more information or the location of your nearest dealer call
(02) 542 3866 TLX: AA176269

KAYPRO®
CORPORATION
Innovators of Electronic Products for Over 33 Years

* suggested retail
★ 20meg does not include a color board.

*Suggested Retail Price Trademarks: IBM, International Business Machines

From

MACE SOFTWARE

The People who brought you *Dac Easy*

Dac Easy Accounting

Australian Version Only
General Ledger, Debtors,
Creditors, Purchase Orders,
Invoicing, Stock Control,
Forecasting (The BIG Programme) $245

Quote this Advert and receive FREE support contract as bonus.

Dac Easy Data Base

(Due January 1987)

A Powerful Database that handles unlimited records, 60 fields per record, can sort or index on any number of fields etc. etc. $145

Pop-Up

Instant tools for Wordprocessing Financial Calculator with memories PopDos, Modem Communications, Alarm Clock, Diary, Names, Addresses, Voice, Calendar, Pop Anything. $99

T/Maker

A large integrated package for the serious user, with Word Processing, Electronic Spreadsheet, List Processing, Graphics, Data Transfer, Files Management, Data Base.

8 only at this price of $395

Dac Tutor

This sought after Tutor gives Basic Accounting Training as well as full tutoring of the popular Dac Easy Accounting Programme.

Available only to Dac Easy Customers.

MS/PC-DOS Tutorial

On disk tutorial, giving the First-Time-User full explanation on how to use DOS to Format, Copy, Create and use Directories, Create Partitions, Sub Directories etc. $37

Mace Utility

Hardly needs introduction, an incredibly powerful Hard Disk Utility, can even restore files after formatting. $149

Doctor DOS

Increases Character I/O by 2 and Certain Non-Disk Related calls by 2 to 5 times. Increases keyboard buffer from 15 to 160 characters. Generally gives incredible speed.. $77

Dac Wordprocessing

Includes Mail-merging, Spelling checker, Windows and all the features you expect of a large and powerful wordprocessor in full colour. $145

Anex

Powerfull Hardware addition to your PC giving you up to 8 extra terminals. Enquire about the all new PC-Annex for one extra monitor/keyboard working in with your existing PC.

MACE-REEL PTY. LTD. (Inc. in Qld.) Trading as MACE SOFTWARE. Phone: (07) 870 3600.
Land Street & Sylvan Road Corner, Toowong, Brisbane, Qld. 4066.
STD Sales Only 008 777 509

THE WEST COAST

Our US correspondent, Tim Bajarin, brings you the stories that matter in the world of microcomputing. This month he looks at the third generation of word processors and examines the ever-decreasing size of the micro.

And a final word comes from . . .

To date, the PC word processor has gone through two generations. The first generation gave us basic editing features, and used the power of disk drive technology to allow us to save and rearrange text.

The next generation added features only known to the dedicated word-processing world and which, until the launch of the PC, were only available using mini or mainframe technology. Such features ranged from sophisticated mailmerger, copy and paste techniques to combining text and graphics.

We are now about to enter the third generation of word processing. This is being driven by products on the Macintosh which utilise the Mac-type user interface to manipulate fonts and columns; in general, we are about to see basic features which up until now have only been used in expensive typography programs.

The most significant product to appear is WriteNow! from T/Maker Graphics. This powerful word processor allows the integration of both text and graphics, and allows you to work with separate columns on the screen. T/Maker is licensing WriteNow! from Apple founder Steve Jobs' new company Next Inc. The package sells for $US195 and is a great improvement on today's word-processing products.

Another variation on this theme comes from Orange Micro. Its new product, RagTime, is similar to WriteNow!, but adds a spreadsheet to the program and allows for the use of financial analysis and business graphics in the word processor itself.

But the product everyone is anxiously awaiting which represents this new dimension of word processing is the next version of Microsoft's Word for the Mac. Those who have seen it believe that it will set a standard for word processsing much the same way that Excel has become a new standard approach for the implementation of spreadsheets.

For the IBM world, look for Word Perfect IV, Samna IV and Word 3.1 to continue evolving as third-generation word processors, although I believe the Mac approach will be the one that defines what third-generation word processors should look like. No matter what PC is used, very soon we will have a word processor that will change the way we write.

Right now Steve Jobs is proud of his latest product

. . . with a few prompts from Xerox

Another part of this new generation of word processors is what has become known as 'Lexiconal' add-on features, the most popular implementations of which are spelling checkers and a thesaurus.

These facilities are achieved through software that's used either as batch processors or is housed in RAM and accessed when needed.

The slickest method of spell-checking is known as real-time spell-checking and has been popularised with Borland's Lightning product.

This type of software allows the user to type away, and when a mistake is made the mircro beeps, so informing the typist of the error. The main problem, however, is that even with a small 35,000-word dictionary, the software takes up considerable code and memory, and leaves less RAM than desired.

Now Xerox has taken a new approach in giving us real-time spell-checking. Selling for $US195, PC Type Right comes in the form of a ROM cartridge which sits between the PC and the keyboard. It is based on technology developed at the Xerox Palo Alto Research Centre using very tight codes and AI techniques to provide a 100,000-word dictionary.

With PC Type Right you just type, as with any word processor, and it automatically checks the spelling. It will even allow the addition of words to its dictionary.

New products to watch for

Datavue Technical Systems of Norcross, Georgia, has designed a computer that could have a major impact on the PC market. Utilising designs based on 'Flow Through Logic', the Datavue 86150 CPU has been designed to be compatible with the processor used in the IBM PC — the difference being that it is 20 times faster! The company says that the 86150 can execute up to 22 million instructions per second.

A multi-million dollar Super Computer runs at 100 mips and the new Hitachi economical super-computer (retailing at $US400,000 plus) runs at 31 mips.

Datavue hopes to sell this machine for around ▶

In a small, small world portable computing is high on everyone's wish-list

Since the introduction of the microprocessor, the race has been on to miniaturise the electronic world around us. We now have mini-TVs, mini-microwaves, mini-steroes and mini-compact disc players.

This trend carries over into the world of computers, and the race is escalating to produce a computer that provides the most facilities in the smallest space. The first attempt to provide a lapheld micro came from Epson; this was followed by Tandy with the Model 100.

In 1983, a company known as Gavilan raised over $US20 million in venture capital funding and moved ahead with its challenge of manufacturing an IBM-compatible, portable PC.

At that time, this computer was considered the machine that would revolutionise the PC market. But, due to problems in management and manufacturing, Gavilan spent all its funds and was unable to supply the machine as planned.

During this same time, industry pundits proclaimed the lapheld micro as the most important breakthrough since the launch of the original PC, and claimed that by 1987 most PCs would be portable. As you know, pundits can be wrong; and in this case they were very wrong.

Although portable computing is becoming more popular, the technology is just not available to allow these miniature PCs to replace those units currently occupying our desks.

But it's not inconceivable that one day they might just replace those large desktop units.

One of the major drawbacks of the truly portable micro has been the slow development of screen technology. LCD screens are hard to read, and electroluminescent and gas plasma screens are expensive and power hungry.

But progress is being made in this area, and the new LCD twist technology is already a great improvement, with products such as the Zenith Z-181 and the recently launched NEC IBM PC-compatible portable using this new screen very effectively.

And we will soon see low-power gas plasma displays become available; and the Zenith flat mask colour television tube (which is already available) uses a new technology and produces an excellent colour image. The television is as flat as a pancake and the image is sharp, the main problem at the moment being price. At $US2784, it isn't affordable by the mass market.

I have also seen prototypes of high-resolution LCD screens that can roll up, and 2in-thick colour CRTs which could allow the portable display to be as sharp and crisp as the standard CRT screen used on current PCs. These could cost well under $US495.

Although such displays are in the early stages of development, the evidence is already here to show how these technologies could make the pundits words come true: the portable or lapheld micro could become the only PC used in the very near future.

The two main leaders in today's lapheld market are Toshiba with its T1100 and T3100 models, and IBM with its PC Convertible.

Industry sources believe that two other giants will soon give us their own version of their already popular desktop PCs. Tandy is reportedly working on a machine very similar to the Toshiba T1100, and Compaq is supposed to be close to showing a portable similar to the Toshiba T3100, with possibly an 80386 chip at its heart.

It may still be a while before portables replace desktop PCs, but the PC of the future could very well be small and portable in nature.

◀ $US10,000. This is one computer to look for: it could blow the PC world wide open . . .

With desktop publishing becoming the hottest application for the PC market, high-resolution screens are becoming more important to the average PC user. Of the new high-resolution systems I have seen, I am most impressed by the Conographic 2800 from Conographic Corporation of Irvine. It displays 2880 × 1024 pixels on its 19in screen — this is four times the resolution of a typical monitor.

Although the price is not available, I have heard that the monitor with a controller card could sell for less than $US3000. Screens like this could have a great impact on CAD/CAM applications, and help move graphics workstations into the mainstream of personal computing.

Apple takes big slice of the pie

When Apple introduced the IIGS in October 1986, the only software that was ready was the paint/draw package from Activision. Although Apple has been very slow in delivering this new computer, due mainly to component shortages, software is now beginning to appear.

When the Mac was introduced, it was many months before there was any software available for it other than that provided by Apple. But with the IIGS, the stakes are higher for software manufacturers. Of the 2.5 million Apple IIs in the world, Apple believes that as many as 30 per cent of these users will upgrade, and software vendors see this as a great new opportunity for them.

Of the packages recently released, a product from PBI Software in Foster City, California, has really caught my attention. Called the Visualizer, it enables the user to produce quality graphs from AppleWorks spreadsheets or through its own Visualizer 'datasheets'.

Visualizer users all the advances of the IIGS, including super hi-resolution, colour and speed, and it incorporates the Macintosh style interface.

Using this new product is like sitting in front of a colour Mac. And, for those who have though about buying a Mac, they may want to wait. It looks like software for the Mac will very soon be available for the IIGS.

All the fun, without the aggravation

One of the neatest Mac games I have played comes from Primera Software. Smash Hit Racquetball is a realistic racquet-ball simulation that features 273 frames of animation and 70k of digitised sound. It moves fast and gives you the exhilaration of playing the game without the sweat. At $US14.95 it's also

DO YOU NEED a low priced Double Sided, Double Density Diskette with a LIFETIME WARRANTY!

COMPUTERMATE has it!

SUGGESTED RETAIL $29.95 per pack of 10

Computermate Supreme Diskettes: high quality with the lowest price and the best LIFETIME WARRANTY!

In the course of selling more and more diskettes every month, we've learned something: higher prices don't necessarily mean higher quality.

In fact, we've found that a good diskette manufacturer simply manufactures a good diskette … no matter what they charge for it. (By way of example, consider that none of the brands that we carry has a return rate of greater than 1/1,000th of 1 percent!)

In other words, when people buy a more expensive diskette, they aren't necessarily buying higher quality.

The extra money might be going toward flashier advertising, snazzier packaging or simply higher profits.

But the extra money in a higher price isn't buying better quality.

All of the good manufacturers put out a good diskette. Period.

How to cut diskette prices . . . without cutting quality.

Now this discovery posed a dilemma: how to cut the price of diskettes without lowering the quality.

There are about 85 companies around the world claiming to be "diskette" manufacturers.

Trouble is, most of them aren't manufacturers.

Rather they are fabrictors or marketers, taking other company's components, possibly doing one or more steps of the processing themselves and pasting their labels on the finished product.

Each of these diskettes is manufactured in whole or in part by another company!

So, we decided to act just like the big guys. That's how we would cut diskette prices … without lowering the quality.

We got TDK to manufacture our diskette to specifications which are higher than most … and simply create our own "name brand" diskette.

Name brand diskettes that offered high quality at low prices.

Boy, did we get lucky. Our Diskettes are the same ones you've been using for years . . . without knowing it.

In our search for the low priced, high quality diskette of our dreams, we found something even more interesting.

We found that there are several manufacturers who don't give a hoot about the consumer market for their diskettes. They don't spend millions of dollars in advertising trying to get you, the computer user, to use their diskettes.

Instead, they concentrate their efforts on turning out the highest quality diskettes they can … because they sell them to the software publishers, computer manufacturers and other folks who (in turn) put their name on them … and sell them for much higher prices to you!

After all, when a software publisher or computer manufacturer or diskette marketer puts their name on a diskette, they want it to work time after time, everytime. (Especially software publishers.)

Computermate Supreme Diskettes. You already know how good they are. Now you can buy them . . . cheap.

Well, that's the story.

Computermate Supreme diskettes don't fall off a truck or emerge from a basement plant just east of Hillsdale.

Computermate Supreme diskettes have been around for years … and you've used them for years as copy-protected software originals, unprotected originals. Sometimes, depending on which computer you own, the system master may have been on a Supreme diskette. And maybe more than once, you've bought a box or two or more of Supreme diskettes without knowing it. They just had some "big" company's name on them.

Supreme Diskettes are good. So good that a lot of major software publishers, computer manufacturers and other diskette marketers buy them in the tens or hundreds of thousands.

We buy them in the tens of thousands.

And then we sell them to you.

Cheap.

When every little bit counts, It's Computermate Supreme Diskettes

You've used them a hundred times … under different names.

Now, you can buy the real McCoy, the same diskette that major software publishers, computer manufacturers and diskette marketers buy … and call their own.

We simply charge less.

PRODUCT*	DESCRIPTION	TPI	BPI	TRACKS/SURFACE	STORAGE CAPACITY UNFORMATTED (BYTES)
SP-2D	Double side/Double density	48	5536	40	500,000

Diskettes are shipped with Tyvec sleeves, reinforced hubs, user ID labels and write-protect tabs in soft pack of 10.

3.5" DS, DD discs also available

THE COMPUTERMATE LIFETIME WARRANTY!

Computermate Supreme Diskettes are unconditionally warranted against defects in original material and workmanship.

Returns are simple: just send the defective diskettes with proof of purchase, postage-paid by you with a short explanation of the problem, and we'll send you the replacements. (Incidentally, coffee stained diskettes and diskettes with staples driven through them don't qualify as "defective".)

COMPUTERMATE 9 High Street, Mt. Kuring-Gai N.S.W. 2080. Phone: 457 8118
products (australia) pty ltd

FAULTY POWER SUPPLIES ?

LOOK AT JUST **ONE** OF THE ADVANTAGES OF CONTRACTING OUT REPAIRS TO YOUR VALUABLE EQUIPMENT.

RELEASE AN ENGINEER FOR MORE IMPORTANT JOBS.

WE REPAIR ALL TYPES OF POWER SUPPLIES.

SWITCHMODE POWER SUPPLIES

PHONE: 799 6465

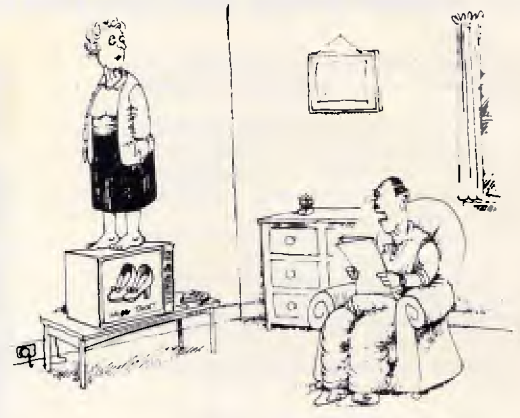
44 KINGSTON STREET, HABERFIELD. NSW

THE WEST COAST

unbeatable value.

For the growing educational needs of 7 to 10 year-olds, you may want to look at the Learning Company's Writer Rabbit. Writer Rabbit teaches children the fundamentals of recognising and constructing good sentences, paragraphs, stories and letters. Youngsters can also be led through six carefully-sequenced games by Writer Rabbit, an animated character.

Parents and teachers can monitor a child's progress and determine specific problem areas by studying game scores. The Apple version of Writer Rabbit costs $US39.95 and an IBM PC version is imminent.



'Yes, they look fine to me dear.'

PHOTON COMPUTERS

PHOTON - 88
- IBM XT-Compatible
- 2 Floppies
- 640 K Turbo
- Colour Card
- Printer Port
- Serial Port
- Games Port
- Real Time Clock/Calendar
- Hi-Res Mono Monitor
- MS-DOS 3.1

$1795

PHOTON - 88
- One Floppy
- 20 Meg Hard Disk

$2595

PHOTON - 88
- With Colour Monitor

$2160

PHOTON - 286
- IBM AT-Compatible
- 1.2 Meg Floppy
- 640 K 6/8 MHz
- Mono/graphics Card
- Printer Port
- 20 Meg Hard Disk
- Hi-Res Mono Monitor
- MS-DOS 3.1

$4450

Phone (07) 394 4488 **DEALER PRICES AVAILABLE**

COMPUTER REPAIRS

Has your IBM-Apple compatible stopped working? We specialise in repairing power supplies, disk drives, motherboards and peripherals for most models.

COMPUTER & ELECTRONIC SERVICES PTY LTD

(03) 561 8947 BH WHEELERS HILL VICTORIA 3150 (03) 561 4683 AH

INTRODUCING THE A★STAR II™

We're having a party! It's a going away party. And, it's for IBM. But, shhhhh! Don't tell them. We want it to be a surprise!

Why a party? Well, it's because we've been told that more than a few of IBM's customers have been "going away" ever since we introduced our A★Star™ PC/AT compatible microcomputer. Now that we've announced our new A★Star II, we figure a lot *more* of their customers will be going away. That's because the A★Star II is the *only* "network ready" PC/AT compatible that can operate at 6, 8, 10 *and* 12 MHz. And because it's now available locally in a super selection of low-cost models.

The A★Star II is not just another clone, it's better...*much* better! Not only is it faster and more powerful than IBM's model, it's also incredibly less expensive. Better yet, the A★Star II is built and backed by Wells American - a company that's been making microcomputers *longer* than IBM. (We bet that surprises even you!) But more than just an AT compatible, the A★Star II is both a single *and* a multi-user system. Each unit is factory equipped for network operation with up to 254 other A★Star, IBM or compatible computers!

If you'd like to be a part of our IBM going away party, clip and return the coupon or call us at one of the numbers below. But don't tell IBM! If they find out how many of their customers are going away, they might just go away themselves! Of course, that would be okay with us. We never *really* invited them anyway!

A 6, 8,10 *AND* 12 MHz AT? WHAT A REASON TO CELEBRATE!

☐ Sounds like a terrific party! Please send me the name of my local dealer.
☐ I'm ready to celebrate NOW! Have your local dealer call or telex me immediately.
☐ Yes, I would like an on-site demo. Please have one of your Sales Engineers call me. (Vic. only. Serious buyers only, please.)

Name:..
Company: ....
Phone/Tlx: ....
Address:.......................................
City:..
State: ....
P/Code: ....

Sole Australian Agents:

KCM Computers Pty Ltd
380 Victoria Street,
Richmond, Vic 3121 Australia
Tel (03) 429 2733 Tlx:AA39766

DEALER ENQUIRIES WELCOME

Wells American
INTERNATIONAL SALES OFFICE

From $A2995.00

Corporate Headquarters:3242 Sunset Boulevard•West Columbia, South Carolina 29169 USA•803/796-7800•TWX 510-601-2645

IBM, Personal Computer AT and AT are trademarks of International Business Machines.

Selling yourself

It's one thing writing what you consider to be a bestselling program, but do you need a major company to handle the product's marketing, or should you go it alone? Kester Cranswick presents the experts' advice.

All software starts in someone's head. The journey it makes from mind to machine to market is long and arduous, and only a few products make it that far. Even fewer achieve real success. Even so, companies such as Microsoft, Lotus and Melbourne House have made fortunes out of software.

Maybe you have a software package that could do as well as WordStar, 1-2-3 or dBase. Or, maybe you have a package for a small market niche that is so far uncatered for. While it's in your head, or in your hands alone, the chances of making money from it are nil. To make a success of your package, you need many skills. You need to have a product that is useful and usable. It needs to have the right packaging, the right documentation and the right distribution. It needs to be marketed and sold to dealers and users. It almost certainly needs more skills than you have at your disposal. Sooner or later, you are going to have to get other people, and other companies involved.

That's why it is important to know a little about the strategies for getting a product to market. The areas this embraces are development, design, duplication, distribution, advertising, accounting and business practice. To get some advice on these matters, you could call on local software developers and distributors, or you could read on.

Strategies

First off, what's wrong with going it alone? It sounds simple. A little bit of advertising, a few sales, a bit more advertising and eventually you might make it. That's the typical mail order approach.

Forget that idea right from the start. If you want to sell to friends, fair enough, but to reach a mass market, you'd need to spend thousands and thousands of dollars, with no guarantee of sales. Customers are not able to see the product before they buy it. You'd find it impossible to provide the sort of after sales support demanded by the market, and you would have no reputation to trade on. In short, it might give you a nice warm feeling, but it won't make you rich.

The only way to get substantial sales is by getting your product sold through a dealer. The only way to get it onto a dealer's shelf, unless you and the dealer are buddies, is to have your product made available through a distributor, or manufactured by a software developer.

What's the difference between the two? It's quite simple. A software house writes, or has written for it, software that it markets under its own name. Software houses may either market directly to dealers and the market, or they may put their products through distributors, locally and internationally.

Software distributors don't develop software. They take products from other companies and individuals, get it out to dealers and market it.

Australia is not a hotbed of software development, compared to the US, the UK and other western countries. We are good at developing major applications for mainframes, because the geography of the country, and the size of its businesses mean that many overseas applications need substantial enhancement.

> *'The first decision you need to make, as the author of a package, is whether to take it to a distributor, or a software house. That decision can be a tough one.'*

We are also good at developing software for niche markets, suited to local conditions, because the developers know those markets intimately, and are able to develop what the users need. The first decision you need to make, as the author of a package, is whether to take it to a distributor, or a software house. That decision can be a tough one.

Software houses

With a software company, you don't have to have a completed product in order to talk turkey. Software houses are as interested in ideas as they are in finished products.

Australia's Melbourne House is one of the most successful games software companies around, and employs a team of 30 programmers. Among its hits have been 'The Hobbit' and 'The Way of the Exploding Fist'.

Sue Anderson, Melbourne House's sales manager, says that in Australia, all software development is done in-house. "We're very open, always looking for ideas and people keen to get their products to the market," she says. However, the bad news is that "stuff sent in by kids is usually very basic and has no professionality behind it. The Australian standard isn't as high as it is overseas," she says. To make a quick killing, nothing beats a chart topping game.

Anderson's advice, if you have an idea for a brilliant game, is to seek professional advice before you start on it. "We know the market, and we can advise on how best to tailor a game idea to that market," she says. If the project does work out, then Melbourne House hopes that the author will come back to it to seek help in marketing.

In that event, the company would either buy the game outright, or negotiate a licence fee and royalty payment. The company has now moved into budget, $10, software too, so has expanded its market considerably.

Earnings from such an arrangement are difficult to predict. A good game has a shelf life of about six months, though in rare instances, a game can sell in quantity for twice that period. Sales depend on the promotional budget given to a game, and Anderson decides that based on the company's perceptions of the likely success of the product.

Asked whether an individual could do all this on their own, Anderson likened the software market to the record industry. "It's like releasing a record yourself," she said. "It needs to be packaged and market correctly if it is to be a hit."

In her view, the market is still after software for Commodore 64 and 16, Amstrad,

Illustration by Nick Hardcastle

Computers with more kick...
and FREE software to boot!

High standards make the new DSE Multitech range more than IBM compatible... we believe they are superior!

Even with FREE software, worth hundreds of dollars, DSE Multitech costs considerably less than the equivalent IBM.

With the power-house PC 900 you receive the integrated program, **Open Access 2:** • word processing • powerful spreadsheet • data base • communications.

Its huge 20Mb hard disk drive and 1.2Mb floppy disk system tackles high volume data processing and networking systems with ease.

Operating 10 times faster than the IBM PC and nearly twice the speed of the highly regarded IBM AT*, there's no limit to the possibilities in your office.

The versatile PC 700 is exceptional value with the user-friendly Microsoft Windows/Mouse pack.

Accounts, word processing or spreadsheet are just some of the uses to which the 640K memory PC 700 can be applied.

A unique selectable operating speed nearly doubles processing time to 8MHz to make short work of long data runs.

The **Microsoft Windows/Mouse** pack eliminates complicated keyboard command entries with simple on-screen 'point-and-press' action for access to all functions.

And for small business or the advanced hobbyist there's no better value than the PC 500.

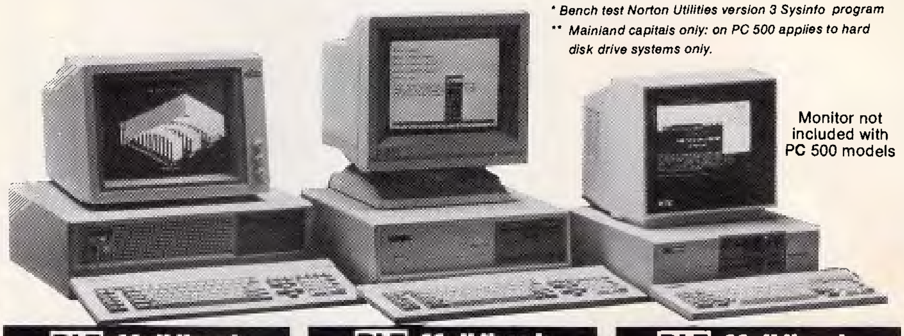
With models ranging from 256K memory and single disk drive, right up to 512K and 10Mb hard disk drive, you're up there with the 'big boys' at an affordable price.

We include the new integrated program, **First Choice,** which contains most of your business needs: • word processing • spreadsheet • data base • communications.

Even if you require other business programs or specialist software, DSE Multitech's MS-DOS operating system is your passport to an extensive range.

Free installation and on-site servicing

Added savings that make the difference between Dick Smith Electronics and other companies. Professional installation in your premises that puts you on line sooner. And if you should encounter teething problems, we'll rectify them without charge for the first 6 months**.



Monitor not included with PC 500 models

DSE Multitech PC 900

$6995

Cat X-8115

- **1.2Mb floppy disk drive**
- **20Mb hard disk**
- **512K CPU — dual speed**
- **14" mono monitor, cable & swivel base**
- **Serial and parallel ports**
- **MGA card — Hercules compatible**
- **DOS 3.1**
- **Open Access 2 software**
- **6 month warranty**
- **6 months on-site service** **
- **Free installation** **

DSE Multitech PC 700

$4595

Cat X-8107

- **360K floppy disk drive**
- **20Mb hard disk**
- **640K CPU — dual speed**
- **12" green screen monitor, cable and swivel base**
- **Serial and parallel ports**
- **MGA card — Hercules compatible**
- **DOS 3.1**
- **Microsoft Windows and Mouse software**
- **6 month warranty**
- **6 months on-site service** **
- **Free installation** **

DSE Multitech PC 500

from $1395

System 1 Cat X-8000

- **360K single disk drive**
- **256K RAM — DOS 2.11**
- **Composite video card**
- **Serial/parallel ports**
- **3 months warranty**

System 2 Cat X-8001

- **360K dual drives**
- **First Choice software**
- **DOS 2.11**
- **256K RAM**
- **6 months on-site service** **
- **6 month warranty** **

---

* *Bench test Norton Utilities version 3 Sysinfo program*

** *Mainland capitals only: on PC 500 applies to hard disk drive systems only.*

DICK SMITH ELECTRONICS COMPUTERSTOP

• *NSW* • *Albury* 21 8399 • *Bankstown Square* 707 4888 • *Blacktown* 671 7722 • *Blakehurst* 546 7744 • *Bondi Junction* 387 1444 • *Brookvale (Warringah Mall)* 93 0441 • *Campbelltown* 27 2199 • *Chatswood Chase* 411 1955 • *Chullora* 642 8922 • *Gore Hill* 439 5311 • *Gosford* 25 0235 • *Hornsby* 477 6633 • *Liverpool* 600 9888 • *Maitland* 33 7866 • *Miranda* 525 2722 • *Newcastle* 61 1896 • *North Ryde* 88 3855 • *Parramatta* 689 2188 • *Penrith* 32 3400 • *Railway Square* 211 3777 • *Sydney City* 267 9111 • *Tamworth* 66 1711 • *Wollongong* 28 3800 • *ACT* • *Fyshwick* 80 4944 • *VIC* • *Ballarat* 31 5433 • *Bendigo* 43 0388 • *Box Hill* 890 0699 • *East Brighton* 592 2366 • *Coburg* 383 4455 • *Essendon* 379 7444 • *Frankston* 783 9144 • *Geelong* 43 8522 • *Melbourne City* 67 9834 • *Richmond* 428 1614 • *Springvale* 547 0522 • *QLD* • *Brisbane City* 229 9377 • *Buranda* 391 6233 • *Chermside* 359 6255 • *Redbank* 288 5599 • *Rockhampton* 27 9644 • *Southport* 32 9863 • *Toowoomba* 38 4300 • *Townsville* 72 5722 • *Underwood* 341 0844 • *SA* • *Adelaide City* 232 1200 • *Darlington* 298 8977 • *Enfield* 260 6088 • *Salisbury* 281 1593 • *WA* • *Cannington* 451 8666 • *Fremantle* 335 9733 • *North Perth* 328 6944 • *Perth City* 481 3261 • *TAS* • *Hobart* 31 0800 • *NT* • *Stuart Park* 81 1977

Want to know more? Send for your FREE information pack. It's obligation free.

☐ **DSE Multitech**

Name

Address

Postcode Phone

B.306/JA

Drop into any DSE store or post to:
P O Box 321, North Ryde, NSW, 2113, Phone (02) 888 3200

Spectrum, IBM, Apple and MSX computers. "The market has slowed down, though it is still into combat games," she said. Her tip for the future is conversions of coin operated, amusement arcade games, because they can be converted to good computer games, and are already known by the market.

Games software is chickenfeed compared to the business market. This is where the software gets useful, and can attain success for more than just a few months. There are scores of software development companies in Australia, developing products for the PC and Macintosh, and many have made significant sales overseas. However, to get where they have, these companies have kept their development in-house. They are not rich enough to speculate on ideas from outside authors. As a result, unless you can persuade a software company to employ you, all you'll be able to get from them, hopefully, is useful advice.

Distributors

When you go to a software distributor, you'll need more than an idea. You'll need to have your software in demonstrable form, as a distributor wants a product that is almost ready to market. Software Corporation of Australia distributes imported business software for the PC and Macintosh markets. It is also on the lookout for locally produced business software. To date, it has only released one package, a typing tutor called 'Touch', but it has sold well both at home and in the US. It was developed by a Melbourne teacher, had an excellent design and was so good that SCA dropped its distribution of two similar products from the US.

Arnold Roth, SCA's managing director, says he is not overwhelmed by the quantity of software offered to him. In the last month, he has only evaluated three packages, and only one of them is being taken on. "We never commission products," he says. "We rely on people coming to us to show us what they have come up with, and our interest is spread by word of mouth." He said, too, that programming tools were not up SCA's street, as the company did not have expertise in that area.

He explained what an author with a developed package goes through in order to get the product marketed through SCA. Firstly, SCA staff examine the product, and make any suggestions or criticisms they feel necessary. "Some developers take this the wrong way, and immediately walk out the door, to find another distributor," says Roth.

If they see merit in the criticism, the next step is for the author to go away, make the suggested improvements and then return with the product. "That is usually much better than the original," says Roth. At that stage, a business deal is negotiated. "We want the right to rewrite the documentation and want SCA notices put in the code. We'll then get a technical writer to do the manual."

After that, and the whole process takes something around three months, it is over to art studios and graphic designers for kicking around presentation concepts and packaging. That can be a drawn out business.

> *'When you go to a software distributor you'll need more than an idea. You'll need to have your software in demonstrable form.'*

SCA prefers to enter into royalty arrangements with software authors, typically of between five and 10 per cent of recommended retail price. "That way both parties share in the success of the product," said Roth.

He related that he had some authors come to him and demand $50,000 for a package. "A big advance payment prices the package out of the market, which, though it may be small, has good potential," he said.

Looking at the Australian software development market, Roth perceives one big area which we miss out on. "There is a missing strata of people who will write mass market word processors, databases and other products that can be sold off the shelf for $1000 or so. It is a question of energy. Overseas, people work in teams to develop such software, and then find distributors. In Australia, we don't have that vision. If we had such product, there'd be a big market. At present, this domestic market is being ignored."

Imagineering is the largest distributor of micro software in Australia, and has a steady stream of programs being sent to it for evaluation. It divides its activities into business and consumer fields, and has had success with a number of Australian products such as communications programs for the Apple.

The company employs staff to evaluate products. When a program is sent in, the first thing is to get a letter back to the author, outlining what the company procedure is. Susan Mullin, public relations officer for Imagineering, says that authors need to have patience. "Sometimes it takes a long time for us to look at and evaluate products."

Her advice to authors is to stand back and look at the product from a users point of view. "Make sure the product is as finished as possible, and as easy for us to look at as possible," she says. "Those products that are in a very advanced state are the exception rather than the rule, and they tend to get looked at first."

In the consumer area, Imagineering is looking for software for the PC, Apple, Macintosh, Commodore, Atari and Amiga. "The business sector is much harder to get into than the consumer area," says Mullin, "and it is very expensive to establish a product."

How easy is it to get your product before a distributor? Well, in Australia, it is not that difficult, as there are few major distributors of business software. Imagineering is the largest, by a country mile. Other major distributors are SCA, Arcom Pacific and Sourceware. All companies would rather have the program sent in by post, rather than the author turn up on the doorstep.

Be prepared to wait for a response. It is no good sending in a package and then expecting a reply in the next week. Distributors have more to do than just examine new software packages. However, all will give you an honest appraisal of your product, and advice on how to improve it if it is not worth taking on in its present form.

There are smaller, almost unheard of, companies too, on the lookout for games and business software. Be wary of dealing with the minnows. They will look at just about anything, in the hope of turning up a gold nugget. If they do, you won't make as much as if you had gone to the trouble of contacting a major distributor, as the smaller company has less marketing

A B L E
ALL IN ONE SOFTWARE
EASY TO LEARN

Instant Replay

Has It Dawned On You Yet?
Prototype-->Program-->Tutorial

) **Instant Replay - $ 89.95**
Demo, Tutorial, and Prototype Generator. Create Replays of actual programs, or vapor ware only replays. Includes Screen Genie Screen Editor, Word Genie Text Editor, and a Keystroke Editor. Insert Pop-Ups, Prompts, Prototypes, and Users into the demo or tutorial.

) **Assembler Genie $ 59.95**
Assembly Language source code generator for including Screen Genie prototype screens into your actual programs. Supports almost every language.

) **Plus Series - $ 59.95**
Assembly Language Programming Tools for Turbo Pascal, MS Pascal, or C. Make your prototypes into real programs.

) **NoBlink Accelerator - $ 49.95**
Resident Cursor Enhancer. Choose your own cursor shape, color(non-blinking), or speed in any program. Uses only 6K of memory. Great time time saver. Why mouse around?

60 day satisfaction money back guarantee on all software. Not Copy Protected.

To order, or to obtain more information call or write
Nostradamus Inc. (801) 487-9662
3191 South Valley Street (suite 252)
Salt Lake City, Utah 84109

NOSTRADAMUS
Software Sourcery

Visa, Amex, Master, Cod, PO, Check
For IBM PC, XT, AT and True Compatibles.
Outside US pays postage.

clout. If your product is a dud, then it won't work, whoever is handling it.

Vertical markets

With a specialised product, you might be able to work through dealers, particularly those specialising in the market for which the product is written. If you know the market, you'll know the customers and what they are looking for. In fact, you might be able to enter into an arrangement with a dealer so that he supplies hardware and you supply software.

However, to tackle this path, you must have a good product, and it must be able to hold its own against the competition. You will have to be not only the software developer, but also the software salesman and the technical support person. If that sounds like too much hard work, then don't start it.

With commitment, this route can be lucrative. One of the largest PC dealers in the country, HiSoft, started life as three men who developed an accounting package for a micro called the Hitachi Peach. When the IBM PC came along, they modified it to run on that, negotiated a distribution agreement with IBM for the hardware and set up a professional sales and support structure. The support proved to be an edge over the competition, so sales were made, giving funds for further software development. Now the company has a multi-million dollar turnover.

Note the team approach. In vertical markets, you need both technical, programming expertise, and knowledge of the market. Not often is that combined in the one head, and so a programmer who decides he or she want to develop a package for the zoo market, without being involved in that field, is on a hiding to nothing.

Mail order

Interface Publishing, run by Tim Hartnell, is a software company specialising in mail order. In his view, the only market is for very narrow vertical market applications. For example, Interface has a program called 'The Lease Assistant' which was written for accountants and is based on recent changes in leasing legislation. Hartnell advertises it in accountancy journals and sells two or three copies a month.

"Mail order," he says, "is the only way to target specific markets." But, he cautions that the cost of getting your first customer can be very high. "The only way you can make money is to have a range of follow-up products, a catalogue, that you can send to prospective customers." So, Interface has a catalogue it sends to people that respond to the ad, and has recently moved into the business of supplying blank disks.

"With a single product, it is extremely difficult to make money," says Hartnell. "Mail order is only a viable proposition if you've got a range of products." However, he says that the advantages of the mail order business is that you have low overheads, needing only one or two staff, no shop premises and a telephone back-up service.

> *'Some developers take this the wrong way, and immediately walk out the door, to find another distributor.'*

His advice for software authors wanting to get their product distributed is to have the sample as close to marketable quality as possible. "The product must stand alone, in that it must be able to be run without the programmer standing over my shoulder telling me what to do." That means that adequate documentation is a must. It also means that you don't have to physically call on potential distributors.

He also says that it is worth approaching companies if you have a useful algorithm which you think might form the basis of a saleable product. However, his advice on mass market software is that there is not much point in doing another word processor, as there is so much excellent competition around.

In his view, the rewards in the Australian market are not great. "Australia is not a giant market. You can look to sell tens of a product, rather than thousands," he says. "For that reason too, you need a fair range of products if you are to have a chance of making money. Even a good product is not going to make giant amounts of money."

Copyright

Suppose you send in a program you have spent months labouring over, and have finally got debugged, running and ready to set the world alight. What guarantee have you got that you won't get tipped off.

Intellectual property and software copyright are grey areas of the law. Short of spending considerable time and money getting a patent on your idea, the best approach is to use the postal system to provide evidence of when you originated an idea.

Dump your program to paper, put it in an envelope and get it franked on a business franking machine. If you don't have access to a franking machine, post the envelope to yourself, and be sure that the postmark has the date clearly visible. Don't open the envelope. Give it to a solicitor, or your bank, for safekeeping, so that if there is any dispute about the authorship of the code, you have dated evidence to back up your claims. The paper dump carries more weight than a disk, as the disks can be tampered with, and this might work against you in a court of law.

If your idea is ripped off, though embodied in different code, then it is a matter for solicitors to work out. If the other party knew of your work, and has produced a version of it, then you may have a case. However, it is not unknown for two separate individuals to come up with the same thing, without ever being aware of each other's existence.

Copyright leads on to the issue of public domain software. Here is an avenue that few authors consider. It is not a way to make money, but it can be used to advantage.

One approach, if you have a range of software products, is to put one in the public domain, with notices in it that refer to other products, or to your services, if they are for sale. Make sure you stipulate that when the software is passed on, the documentation is left in its original state. Alternatively, you might put a demonstration version of your program in the public domain, with a notice advertising the full blown product, and its price.

Although many public domain programs ask users to send a small amount of money to the author, this doesn't happen very often. Consequently, the spirit of altruism in the public domain field is disappearing, at least outside the US. More and more of the best public domain software is being taken on and sold by software distributors.

ABLE
ALL IN ONE SOFTWARE
EASY TO USE

MICRO PRO Computers

5686911 5690169
5695450

43 ATHERTON ROAD, OAKLEIGH

TELEX
32679 BASIS

A Reliable Company You Can Trust

CELEBRATING
11 YEARS
IN BUSINESS

PERCOM
Engineering Company

FULLY LICENSED MICRO PROFESSIONAL PC/XT

- 640K RAM
- JOY STICK & PARALLEL PORT
- 2 x 360K DRIVES
- CLOCK & BATTERY
- AT STYLE CASE AND KEYBOARD
- COLOUR GRAPHIC VIDEO CARD
- KEYBOARD LOCK & RESET
- PC WRITE GAMES & MANUALS
- LICENSED MS DOS 2.11
- LICENSED BIOS
- 2 SERIAL PORTS 1 IMP

$1395
INC. TAX

FULLY LICENSED MICRO PROFESSIONAL PC/AT

- 1 MEG MEMORY
- 20 MEG HARD DISK
- 1.2 MEG FLOPPY AND 360K FLOPPY
- SPEED 6,8 and 10 MHz
- CLOCK & BATTERY
- 200 WATT POWER SUPPLY
- SERIAL & PARALLEL PORT
- COLOUR GRAPHIC CARD
- LICENSED MS DOS 3.2
- LICENSED BIOS

$3750
INC. TAX.

DEALER ENQUIRIES WELCOME

Special student discounts apply

PRINTERS
132 COLUMN

EPSOM FX 105 160 CPS NLQ TRACTOR FEED	$990
BROTHER 1509 160 CPS NLQ TRACTOR FEED	$895
STAR SG15 160 CPS NLQ TRACTOR FEED	$670

PRINTERS
80 COLUMN

EPSOM LX 86 120 CPS NLQ TRACTOR FEED	$520
SUPER 5 EP 1000 100 CPS NLQ TRACTOR FEED	$470
STAR NX10 80 COL. NLQ TRACTOR FEED	$495

DISKETTE HOLDER

ANTISTATIC, LOCKABLE

CAPACITY 50	$25
100	$38

MODEMS

WD 150 U21 — U23 (VIATEL)	$175
WD — 7012 U21 — U22 AUTD ANSWER AUTO DIAL HAYES COMPATIBLE	$329
WD — 1600c U21 — U22 AUTD ANSWER AUTO DIAL HAYES CDMPATIBLE HAND SET	$369

HARD DISKS

30 MEG/CONT VOICE COIL	$1575
20 MEG WITH CONTROLLER (FULLY INSTALLED)	$950

PROCESSORS

8087 CO — PROCESSOR	$290
8087-2 CO — PROCESSOR	$360

MONITORS
EGA

TVM MD7 & CARD	$1450

MONITORS
Composite

SAMSUNG 12" GREEN	$180
SAMSUNG 12" GREEN/AMBER TILT SWIVEL	$205
DATAS GREEN/TILT SWIVEL	$175

MONITORS
TTL

SAMSUNG 12" GREEN/AMBER TILT SWIVEL	$260
TAXAN 12" GREEN/AMBER	$350

MONITORS
RGB

THOMPSON	$595
TVM MD3	$660
TVN MD7	$1075

PERIPHERAL CARDS

384 K MULTI FUNCTION	$199
MONO GRAPHIC (HERCULES)	$199
EGA CARD	$450
COLOUR GRAPHIC	$169
EPROM BURNER	$199
512K RAM CARDS	$99
SERIAL CARDS	$89

MOUSE

ZNIX (BUS) MOUSE	$135

JOY STICKS

SELF CENTERING	$35

KEYBOARD

IBM AT STYLE RT KEY BOARD

12 FUNCTION KEYS SEPERATE NUMERIC AND CURSOR CONTROL KEY PADS	$169

● IBM is reg. Trade Mark of International Business Machines. Prices as at 27/11/86. Price subject to change without notice.

Going it alone

If you've tried without success to find a distributor, or think you have what it takes to go it alone, then be prepared for a tough life. Even if the product is already developed, there will be substantial costs involved in telephone bills, postage, computer paper and so on, all of which you must bear. You will be able to write these down as business expenses, against income, but the money must be paid in the first instance.

Talk to your bank manager too. You'll need an overdraft facility to see you through the time until quantity sales start to come. Cashflow can be a problem when a new business starts off.

If you will be entering into substantial debts, for production, printing and the like, a limited company is a good protection against losing all your assets should the product fail. Your solicitor or accountant can set up a company for you, for around $1000, and you will be limited in liability to the amount of money you invest in shares in that company.

If you go in with a partner, be sure of the person you set up with. You are both responsible for the total debts of the company. You can also try and get loans or government grants to finance an enterprise. Generally, investors are looking for products which have good, long term potential, and are not just one-offs. The government is most interested in products with export potential. Most state governments run small business advisory centres to give assistance to entrepreneurs who want to get a business going.

Getting your product known is a matter of publicising it, through advertising and the press. Send review samples to those magazines and journals which cover the market you are aiming at, and hope the reviews are favourable.

Look at the returns you expect to get. Unless you can get a return of a decent salary for yourself, plus $20,000, then it is hardly worth going into business on a full time basis. The alternative is part time, mail order selling, giving small returns but at least getting your product into the market.

Going in with a distributor is the best route, providing you have a product they will take on. That may involve you having to spend money up front promoting the product, and certainly means that your product must be crash hot to have a chance of succeeding. Going in with a software house means putting your reputation on their line. If they do well, so might you. If the software house goes down, you're in trouble.

Whatever you choose to do, make sure you have a good solicitor and accountant. The road to software riches is strewn with failures, for all sorts of reasons. But, if you have the next dBase nearing completion, and you are prepared to work to get it to market, you could be in the money.

MICRO-EDUCATIONAL P/L
8/ 235 Darby St NEWCASTLE 2300
Australia's largest computer mail-order company.

FREE

OUR LATEST LIBRARY DISK FOR YOUR
APPLE, IBM, or MACINTOSH
(Add $10 for Mac 3.5" disks)
These disks contain the best in public domain software.
Send 6 x 36c stamps for post.

Ask for your **FREE CATALOG**

Dear George,
Please rush me a free library disk for my IBM/ APPLE/ MACINTOSH
(Add $10 for Mac disks)
Enclosed Please find 6 x 36c stamps.

NAME:
ADDRESS:
P/CODE:

BACK 4 UP
ESSENTIAL DATA DUPLICATOR

Back up your copy-protected disks with **ESSENTIAL Data Duplicator 4 PLUS** ■ **EDD 4 PLUS** is new technology, not just 'another' copy program. The **EDD 4 PLUS** program uses a specially designed hardware card which works with your disk drives to back up disks by accurately copying the bits of data from each track. Don't be fooled . . . no other copy-program/system for Apples can do this! ■ In addition to backing up disks, **EDD 4 PLUS includes several useful** utilities such as examining disk drives, certifying disks, displaying drive speed rpm's, plus more! ■ **EDD 4 PLUS** runs on Apple II, II Plus (including most compatibles), and IIe, and is priced at $190.00 (duodiskl/ unidisk 5.25 owners must add $32.00 for a special cable adapter). ■ A standard **EDD 4** version which doesn't include any hardware is available, and can be used on Apple IIc and III (using emulations mode) and is priced at $125.00.

■ Bankcard and Master card accepted by phone. Add $3.00 to all orders for postage and handling. All orders must be prepaid.

WARNING: EDD is sold for making archival copies only.

UTILICO SOFTWARE
83 HALL ST., BONDI BEACH,
NSW 2026 PHONE (02) 30 2105

ABLE
ALL IN ONE SOFTWARE
EASY TO BUY
$300 *inc.*
TILL 31-1-87

Tackling the intelligence quotient

Martin Banks provides illumination on expert systems and implications of sophisticated developments and future applications.

Artificial intelligence is one of those subjects about which everybody has an opinion, but often little or no specific knowledge. I include myself in this category.

For example, I find myself wondering how it is possible to create an 'artificial' intelligence when we have so far failed to understand anything about 'real' intelligence, except that it exists. I also have this sneaking suspicion that the words intelligence and computer are mutually exclusive.

I have less difficulty with the idea of an 'expert system', because I can see how getting a computer to mimic the activities of an expert, to 'learn' the tricks that are used in any particular activity is ideally suited to the rule-following nature of the moronic machine.

In many applications an expert system can be an excellent tool, helping to spread knowledge and, more importantly, its use in everyday life. The trouble with expert systems has been, however, that the things are generally too damned big. There are some small, very specific applications that run in the PC environment, things like medical screening, for example. However, the majority of expert systems applications are stuck in the not quite real world of the megacomputer system. Not too many people need to geothermally map an entire continent just to find rare minerals, which is the sort of application currently considered the norm.

One of the problems with expert systems is that they are generally written in a language called Lisp, which tends to have a predisposition towards large computers. A lot of processing clout is needed to get into the world of symbolic processing, but a way round that has recently come riding in from cowboy country.

Texas Instruments has produced this expert system gizmo, you see. Well, actually, they have been in the business for a while, having not so long ago introduced a 'small' expert systems computer called Explorer. This is, in practice, quite a chunky minicomputer, but in the world of symbolic processing, it's small. As many will know, TI is also in the big league of the semiconductor business, currently third or fourth largest chip-maker in the world.

Taking its corporate cooking pot, TI has poured both these activities in and stirred. The result is something known as the Megachip — essentially the processing guts of the Explorer computer in a single chip. The specification makes it out to be quite a beast: 32-bit architecture, over half a million transistors packed into a chip one centimetre square and a clock speed of up to 40MHz.

One of its first applications is in a TI system called the Compact Lisp Machine (CLM), essentially an expert systems engine in a shoe-box. More significant, however, is the fact that the company has no plans to keep the chip to itself. Anyone that wants it can have (sorry, pay for) it.

> *'32-bit architecture, over half a million transistors packed into a chip one centimetre square and clock speed of up to 40Mhz.'*

So it becomes possible to put a real Lisp-running expert system engine into other computers as an integral part, or maybe as an add-on.

This opens up some intriguing possibilities. It would, for example, seem a racing certainty that some company or other will produce an add-in card for the PC family. The way memory capacities are going and the prices are tumbling, it would not surprise me to see such a board, with two or more megabytes of RAM, hitting the streets for around $4000. That may sound a lot but it isn't when you think what could be done with it.

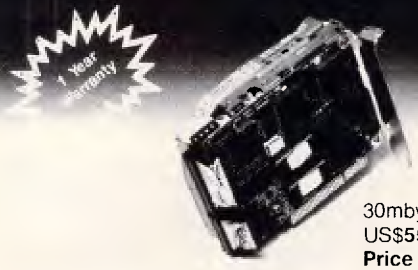
TI, being a big company, tends to think in terms of 'serious' applications. One of their suggestions concerns software development, where a desktop system could be developed to be an expert 'systems analyst'. The user, perhaps even the person directly involved with the specific application, would be able to sit at the keyboard, type in some words such as 'I wouldn't mind if the software could do this . . . or alternatively, that', and the system would work out whether it was possible. It might even be able to decide which language was best and write the code for you.

But there are many other applications where such a system could prove useful. Databases, for example, are terribly useful things which no one has yet worked out the best method of manipulation. Imagine having a PC to which the question could be put, in natural language, 'Is there anything, anywhere, on green people with red hair?'

Not only might the system search every file on your own disk, but it could also go off itself and organise searches in remote databases via communications links, all from one command.

Then again, I could produce a system that would search through past articles I have written, learn my style of writing and combine the two to come up with convincing pastiches to meet future commissions. I look forward to that day, but for now I can assure you that this column has not been written by a ma . . by a ma. . END

HARD FILE



20mbyte
US$**479** ONLY

30mbyte (RLL Format)
US$**559** ONLY
Price including postage

Feature:-
1. Easy to install
2. Plug and work with any IBM or compatible machines
3. Lower power consumption
4. Short slot mounting
5. Compact and small size
6. Fast speed access time (65m sec)
7. 20mbyte or 30mbyte available (option)

Order Form

Please fill out in block letter, detach and return this part or the entire form to the address below:

★ I would like to purchase:

☐ 20mbyte HARD FILE

☐ 30mbyte HARD FILE

★ Enclosed a bankdraft for US$ ____________

★ Or charge to my Credit Card

☐ MasterCard ☐ VISA

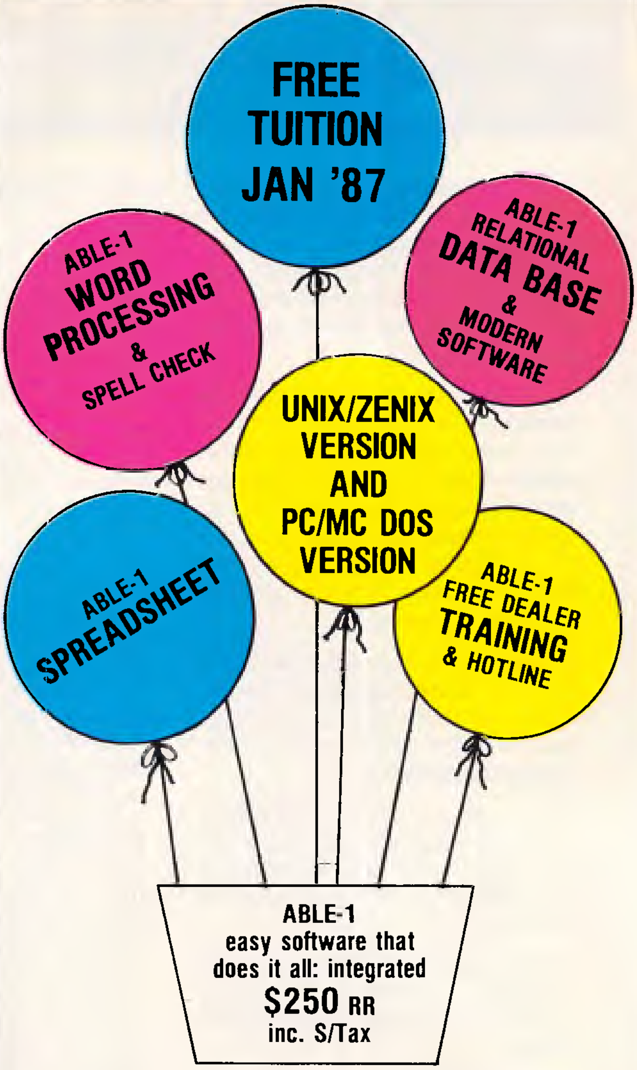
Amount : ____________
Card No. : ____________
Expiry date : ____________
Signature : ____________

Name : ____________
Address : ____________
____
Tel : ____________

Please mail to:

Syntax Computer Pte. Ltd.
2, Alexandra Road #06-03
Delta House, Singapore 0315.
Tel: 2731133 (4 Lines)
Telex: RS 42083 SYNT
FAX: 2731959 Cable: SYNTAXCOM

Agent Wanted


FREE TUITION JAN '87
ABLE-1 WORD PROCESSING & SPELL CHECK
ABLE-1 RELATIONAL DATA BASE & MODERN SOFTWARE
UNIX/ZENIX VERSION AND PC/MC DOS VERSION
ABLE-1 SPREADSHEET
ABLE-1 FREE DEALER TRAINING & HOTLINE
ABLE-1 easy software that does it all: integrated $250 RR inc. S/Tax

DEALERS & CORPORATE BUYERS

SOFTWARE bundle ABLE-1 with your computer huge bulk discounts and we provide training Australia wide

HARDWARE dealerships negotiable buy in lots of 5, 10, 20, 50.

FREE TRAINING DEC/JAN

INTRODUCTION TO

- DOS
- DATABASE
- GRAPHICS
- SPELLING CHECKER
- WORDPROCESSING
- SPREADSHEETS
- MAIL MERGE

* IF
— YOU SELL COMPUTERS
— WORK FOR A MANUFACTURER/DEM
— OR IF YOU OWN A COPY OF ABLE

ABLE
(02) 817 4129
(02) 476 5760

ALL IN ONE SOFTWARE
$300 inc tax
Till 30/1/87

FREE SOFTWARE

SPECIAL SELECTIONS FROM THE PUBLIC DOMAIN (02) 29 2866

Well, almost free. We don't charge for the public domain software but there is a small service charge of $15 per disk to cover promotion costs, selection, testing, copying, etc. Disks are available for CP/M, MS-DOS and APPLE. Mail and telephone order only.

The programmes have been carefully selected, tested and documented. They'll run on a wide variety of computers that accept 5¼" disks. We have tried to choose programmes as machine-independent as jossible. However we cannot guarantee the suitability of programmes for your particular machine. Wherever possible we include source-code.

MS-DOS programmes are aimed at the IBM-PC and close compatibles. The NEC APC III will often require the software library extension card to be able to execute these programmes.

Documentation is included on the disks where required — often it is very extensive. Unfortunately, we are unable to provide telephone tutorials on using the programmes.

MS-DOS disks are formatted for standard MS-DOS 2.11 360K. Testing has been carried out for CP/M disks on a Z80 Kaypro II.

About 120 different formats are supported, including Kaypro, Osborne, Tandy, Microbee, Bondwell, Commodore 128, Televideo and Apple II.

MS/DOS

DISK No.

GAMES

M5: SUPER COMPILED GAMES. Eight arcade games for those with colour graphics adaptor. Very absorbing. Includes Pango, Gold, Pyramid, 3-Demon, etc.

M8: SELECTED FAMILY FUN GAMES. A flight simulator, music generator, excellent Pacgirl, space wars, etc.

M11: MONOPOLY. An excellent computer version of this popular board game.

M12: GAMBLING GAMES. One-Armed Bandit, Poker, Blackjack, Roulette.

M13: DUNGEONS & DRAGONS. Cave Quest — a very good adventure game. If you like monsters and magic this is for you.

M14: CREATE YOUR OWN ADVENTURES. An adventure shell that enables you to design your own game.

M15+: TRIVIA COLLECTION. A two-disk set in the trivia quiz traditon. Will amuse you for hours. $30.

M16: MOVIE DATABASE. Contains details of nearly 2000 movies which are available on videotape. Search by title, rating, cast members, writer, director, etc.

M17: PINBALL GAMES. Contains three fascinating games of varying degrees of difficulty. Engrossing.

M18: SOLUTIONS TO ADVENTURE GAMES. Special collection of hints to solve games such as ZORK I, II, III, Hitchhikers, Starcross, Deadline, Witness, Mask of the Sun, Serpents Star, Dark Crystal, Planetfall, The Enchanters, Death in the Carribean, Infidel, and Seastalker.

M19: NAME THAT TUNE. Designed in the trivia tradition, your computer plays well-known but frustratingly elusive melodies.

UTILITIES

M21: UTILITIES. These are essential and include file maintenance superstars like **SWEEP** and **WASH** as well as library and squeeze/unsqueeze programmes. Lots of them.

M23: UTILITIES. Make life easier for yourself with programmes like Util, Z, Vtype, ST, Protect, Unprotect.

M25: SELECTED UTILITIES. Dozens of highly useful utilities, with documentation, compiled and ready to go. Includes Autodex (super file manager), Membrain (ramdisk) Squeeze and Unsqueeze, Directory Printer, Calendar, File Finder (great for hard-disk), Keyboard Definer, etc.

M26: UTILITIES FOR PERSONAL MANAGEMENT. Similar to side-kick, these are background utilities that provide calculator, notepad/editor, phone index, alarm clock, calendar, printer controls, typewriter-simulator, window access to directory, display/remove/copy/rename files, etc.

M27+: UNPROTECTION METHODS. Hints and programmes that help you to back-up a variety of copy-protected programmes. New 3 disk set for $30 instead of $45.

M29: DISK LIBRARIAN. A collection of some of the best programmes available for cataloguing your disks and keeping track of files. Provides an alphabetical master list, etc.

M32: DISK DOCTOR COLLECTION. Some of the best debugging and file repair programmes around. Includes Jaz, Easy-Zap, Diskit, etc. OK for hard disks too.

M33: HARD DISK UTILITIES. A special collection of utilities from more than two dozen other disks. For cataloguing, sorting, backing up, changing file attributes, etc.

M34: MULTI-TASKING SHELL. On this disk we have two excellent DOS Shells which allow you to operate and execute from a menu system — Dosamatic and Still River Shell. Interrupt tasks and switch to other programmes, Enjoy a superior work environment.

M35: CP/M EMULATION. Run CP/M software on your PC! Well documented and source coding is provided.

M36: SUPER DISK CATALOGUER. This is a superior capacity disk cataloguer that will put order into your files, print listings, locate files, give directory printouts, etc. Ver. 1.3.

WORD PROCESSING

M43: MULTI-FONT WRITER. An incredible word-processing package that prints out scientific notation, Greek letters, gothic, italics, etc. Recommended.

M48: OUTLINER FOR WORD PROCESSING. Considered by many to be the best outliner/ideas processor available. Is fast, can be memory resident, has windows, excellent printing features, etc.

M49: FORM LETTERS. Examples of the most commonly-used business letters — overdue accounts, apologies, credit, layoff, account acceptance, thank you, invitation response, and many more.

M50: PRINTER AND TEXT UTILITIES. Includes memory-resident Note Pad and Cut & Paste, Index System for text files including Wordstar, and Epson Printer Control that sets printer and provides foreign characters.

M51: STYLE ANALYSER. Examines text that you've written and suggests ways that you can improve written expression.

M52+: POWERFUL WORD PROCESSOR. With many features such as split screen, windows, macros, footnotes, indexing, mail-merge, programming language and laserjet drive. Two disk set $30. NY Word vers 1.2.

GRAPHICS

M61: GRAPHICS. A selection of some of the best programmes in the public domain, including an extensive picture-graphics set of commercial standard.

M65: SPRITE GRAPHICS. Lets you create sprite characters from a set of coloured pixels for your programmes. It is self-documenting and contains a sample file. Allows you to display the figure in one step.

M66: EXTENDED FONT CHARACTERS. PC-FONT ver 2.04 is a utility for Epson-compatible printers that will print all of the printable characters of MS-DOS character set — including block graphics, engineering and scientific, foreign language, etc. Control the size, style, density, linespacing, etc. Have solid underline and vertical lines. Gives a more professional output.

M67: COMPUTER-AIDED DESIGN. Powerful control over drawing, graphics, printing and slide show. For easy creation and editing of graphics screens. Two disk set $30.

M68: GRAPHIC CHARACTER GENERATOR. Create a variety of graphic icons. Also lets you cross-stitch graphics. Contains Icon Master.

LANGUAGES

M85: LANGUAGE — **PASCAL.** One of the most popular languages for general programming. Well-documented. A very good choice for learning to programme.

M87: SCREEN DESIGNER. An easy to use interactive screen designer to assist you with your programmes. Suits Basic programming.

M91+: TURBO PASCAL LIBRARY — SET 1. Special set of routines, aids and utilities for programming in Turbo Pascal. 7 Disks for $70 instead of $105.

M92+: TURBO PASCAL LIBRARY — SET 2. Special set of routines, aids and utilities from Turbo User Group for programming in Turbo Pascal. 6 Disks for $60 instead of $90.

M93+: C LANGUAGE LIBRARY. Special set of routines, aids and utilities for programming in C. 6 disks for $60 instead of $90.

M94+: ARTIFICIAL INTELLIGENCE. These disks contain TWO Expert System Shells — ESIE and EXPERT. They help you design a system that will gather information and make a recommendation. $30.

M95+: LANGUAGE — BASIC. This is Snocrest Basic, a two-disk set that contains a real Basic interpreter with manual Also suits a multi-user system. $30.

FREE SOFTWARE

SPECIAL SELECTIONS FROM THE PUBLIC DOMAIN (02) 29 2866

M96: LANGUAGE — LOGO. Ladybug provides a popular, turtle-graphics oriented version of this language. Suitable for teaching computer concepts to kids.

COMMUNICATION

M101: COMMUNICATIONS, MODEMS. Two major communication programmes — qmodem and kermit. Lots of bells and whistles.

M103/4: BULLETIN BOARD. A New version (14.1A) of RBBS, a very popular system for those wanting to operate a bulletin board. Well-documented. In compiled Basic with source code. Two disk set $30.

M107: BULLETIN BOARD LISTING. A comprehensive list of Australian Bulletin Boards. Text files are available in a variety of disk formats.

M108: COMMUNICATION — QMODEM ver 2.OE. A popular programme for modems. Has installation programme. For communicating with bulletin boards. An update.

M109: COMMUNICATION — KERMIT ver 2.28. An updated version of this well-known programme for communication with bulletin boards and other computers. Has source code.

M110: FIDO COMMUNICATIONS NETWORK. This is a famous Bulletin Board System that links up with other bulletin boards.

BUSINESS/ACCOUNTING

M121: GENERAL LEDGER ACCOUNTING. A small-business recording system. Highly regarded. Excellent reports.

M124: STOCK MARKET ANALYSIS. Special aids to help you "think and grow rich". For managing and evaluating portfolios and prospects.

M125: PROJECT/TIME MANAGEMENT. Improving organisation and goal accomplishment. Arranges information, prompts for action.

M126: STATISTICAL ANALYSIS: EPISTAT V3. More than two dozen related basic programmes for analysis-including Chi square, linear regression, Fisher, Binomial, Analysis of Variance, Histogram, Poisson, Correlation, etc.

M128+: INTEGRATED SPREADSHEET. A two disk set of a comprehensive spreadsheet programme. Has Basic and compiled versions with documentation. $30 for 2 disks. Includes integrated word processor/ spreadsheet/database/graphics.

M129: 1-2-3 UTILITIES. Highly regarded collection of utilities that enhance the operations of Lotus 1-2-3.

M132+: 1-2-3 WORKSHEETS. Comprehensive special set of worksheet, aids and utilities for lotus 1-2-3. $80 for 8 disks instead of $120. (Does not include M129).

M133: BUSINESS EMULATION. Examine alternatives for better results in manufacture, marketing, advertising, sales, finance, purchasing, labour relations, personnel, banking, and financial planning.

M134+: DEBTORS BILLING. A comprehensive system for maintaining debtors' records, issuing notices and analyses, etc. Two disk set $30.

M135+: FARM MANAGEMENT. A useful collection of decision/analysis tools. Includes computations for gestation and feeding, harvest and storage strategies, firm price analyses, break-even prices and yields, livestock diets, budgetting, loan calculation, and more. Menu driven.

M136: PROJECT MANAGEMENT. For construction. Will handle 1000 tasks and does critical path analysis, cash flow, bar charts, cost reports, etc, with subcontractors. Menu driven.

M137: STOCK CHARTING. Keeps track of Stock Market movements —highs, lows, volume, moving average, etc. Requires Basic.

M138+: SALESMAN'S FRIEND. Helps you to keep track of prospects, leads and memos. Also has a built-in word processor and sample formats of letters. Two disk set with tutorial: $30.

M139: PROJECT QUOTATION. Prepare quotations for projects combining materials, parts, labour, profit margins, etc.

DATABASE MANAGEMENT

M142+: DBASE 11/111 APPLICATIONS. Extensive group of Dbase applications, programme extensions and algorithms. Includes cheque programmes, mail management, inventory control, budgeting and accounting, memo maker, phone index, menu drive, typewriter simulation, depreciation, automatic formatting, search for duplicate entries, Spanish lessons, runtime decoder, graphics and other utilities. Set of 5 for $50 instead of $75.

M143: FAMILY TREE/GENEALOGY. Extensive programmes in basic for recording, tracing, grouping, printing, etc., family relationships.

M147: DBASE 111 SCREEN/CODE GENERATOR. Greatly reduces the amount of programming you need to do. Much of the coding is generated to include in your own programme.

M149: FORMS AND REPORTS. A forms generator for displaying information contained in data bases. Compatible with PC-File also.

M150+: SUPER NEW DATA BASE MANAGER. File Express suits sales/stocks/mailing/personnel/payroll. Will calculate, print invoices, labels, etc. Compatible with PC-File. Two disk set $30. Very good documentation.

M151: MAILING LIST MANAGER. Well-documented programmes that allow you to add, edit, sort, and print mailing labels for all members or selected groups.

M152+: RBASE LOOKALIKE. A three disk set of a powerful, sophisticated database management programme (PC-RIM — Relational Information System ver 5). Operates as standalone system in both menu and command modes or will drive application programmes. Has natural language query system. Extensive documentation and help files. $45.

EDUCATION

M201: EDUCATION. BASIC TUTORIAL. How to programme in Basic. Onscreen demonstration and explanation.

M203: MATHS TUTOR. A Basic programme that suits primary classes. Has six grades of arithmetic training.

M204: PC-TUTORIAL. Learn more about the operation of your computer, the important commands, etc.

M205+: SPELLING AND VOCABULARY. Suits high school+. Contains 7500 words, but not the most common 4000 — the next most commonly used words. Compiled, with Basic source code included. 4 disk set for $45 instead of $60.

M206: HISTORY EDUCATION. A Basic educational game that teaches history. An adventure approach that wins/loses gold, has time warps etc. American conditions but questions can be changed.

SHAREWARE REQUIRED FOR INTERNATIONAL DISTRIBUTION

Select Software has offices and extensive marketing facilities in Australia, New Zealand, the U.K. and very soon in the U.S.A. We are looking for quality Australian and New Zealand software for distribution locally and overseas.

We promote directly to the end user so your product is brought to the attention of hundreds of thousands of potential users, as well as being described in our catalogue.

You retain copyright and we collect on your behalf contributions made by satisfied users. If you wish we can also release your enhanced versions and updates to those becoming registered users.

Naturally we require your permission to copy and distribute your programmes and to charge our normal service fee. Submissions should be original and designed to run on the IBM PC and compatibles. Adequate documentation is required on the disk.

A number of software authors who have been successful with shareware are earning hundreds of thousands of dollars each year — whilst striking a blow for low cost software!

This is your chance to break into the **International** market at no cost to you. Submissions should be sent to our Chief Executive at the address below.

APPLE II, CPM, MACINTOSH COMMODORE 64

Call or write for free catalogue.

PUBLIC DOMAIN NEWSLETTER

For news, reviews, views and how to use public domain software subscribe to our bi-monthly newsletter and keep informed on the free programmes that help your computer to serve you. Only $15 per annum. Includes updates to catalogue.

ORDERS

Each disk costs $15 (Macintosh $20). Add 20% Sales Tax to cost for disks plus $3 postage and packaging to your total order. Orders must be prepaid.

*The Public Domain Newsletter costs $15 per annum and is issued bi-monthly.

PAYMENT BY MAIL TO:
Box C343 Clarence St, PO, Sydney NSW 2000.

TELEPHONE ORDERS:
Pay by Bankcard, Mastercard or Visa.
(02) 29 2866, (02) 29 3810, (02) 29 1915.

OFFICE:
3 Barrack St., Sydney. NSW.

PLEASE INDICATE THE DISK FORMAT REQUIRED WITH AN ALTERNATIVE FORMAT IF POSSIBLE.

SELECT SOFTWARE

Mail And Telephone Order Only.

We cannot guarantee the suitability of public domain/user-supported software for users' needs or equipment.

Magic Sac

Data Pacific's Magic Sac enables you to run Macintosh software on an Atari ST, but don't expect to use any serious applications with the cartridge in its present form. Nick Walker assesses its capabilities.

It's an eerie sight watching an Atari ST running Macintosh software. I'm used to seeing any number of IBM clones running IBM programs, but the Macintosh has so much of its fundamental system software in ROM that producing a clone is almost impossible. But, after convincing myself that there wasn't a Macintosh under the desk, I sat down to find out more about the little grey cartridge that magically transforms an ST into a Macintosh.

Inside the MacCartridge (as it was first called) there should be two Apple ROMs from either a 128k or a 512k Macintosh, so it isn't quite as 'magical' as it first appears — most of the system software is the original Apple code contained within these two ROMs. The original plan was to sell the cartridge complete with copies of the Apple Macintosh ROMs. Apple understandably put a stop to that by threatening to sue the MacCartridge's US manufacturer, Data Pacific, as the ROMs were definitely copyright Apple. The MacCartridge never saw the light of day as a commercial product but its successor, Magic Sac — a MacCartridge without ROMs — did. It is this product which will be available in Australia from Paris Radio Electronics.

For the Atari ST — a micro still trying to establish itself on the market — the Magic Sac can only be good news: suddenly, an extra 700+ applications are available. Unlike the MS-DOS and CP/M emulations that are already available for the ST, these new applications don't mean a trip back to the dark ages of the awful 'A>' prompt.

The ST's high-resolution screen and 68000 processor mean that Mac applications can be used to their full advantage in that they expand to fill the entire ST screen. Amiga owners will also be pleased to hear that Magic Sac is planned for that machine, and the very nature of the Amiga's screen and disk means that the Magic Sac should be even more compatible.

In selling an empty cartridge, Data Pacific has transferred the problem of obtaining the Apple Macintosh ROMs to the Magic Sac purchaser. To further protect Data Pacific's interests, the cartridge is billed as an upgrade for the Apple Macintosh, so officially the Magic Sac is only of use to Macintosh owners who are willing to open their machines in order to run Mac software on an Atari ST. This situation reminds me of the modem manufacturers who sell unapproved modems with the proviso that they are not used on public telephone lines.

In Australia, Apple's official line is that, the controls it applies to the issuing of ROMs make it difficult and expensive to obtain them. So Paris Radio is recommending Magic Sac purchasers to purchase them directly from a US Apple dealer, B & C Computers, for $US50 a pair.

Perhaps Apple should make the ROMs generally available at a reasonable price, and be grateful for the increased market awareness that move will give the Mac-

intosh and its software. If Apple applies restrictions to the sale of ROMs, people will resort to dealing with the underground network of hackers and pirates.

Before purchasing a Magic Sac you'll need the following: an Atari 520ST with a floppy disk drive, or an Atari 1040ST; an Atari monochrome monitor: two 32k Macintosh system ROMs; the Macintosh software you require; and access to a Macintosh to transfer the software across.

Paris Radio supplies an empty Magic Sac cartridge, an ST disk, a Macintosh disk, a Mac-to-ST serial cable, and a slim 25 page manual.

Installation & set-up

When you have the two ROMs, installation is just a matter of pushing them into two empty sockets and hoping you don't bend any of the pins. This should in theory take less than a minute, and if you're the kind of person who doesn't read manuals, it will. The manual, however, explains how to put the ROMs in the wrong way round! To check that the ROMs have been installed correctly, run the Macintosh emulation program; if you make it through to the 'Happy Mac' boot-up screen, the ROMs are fine.

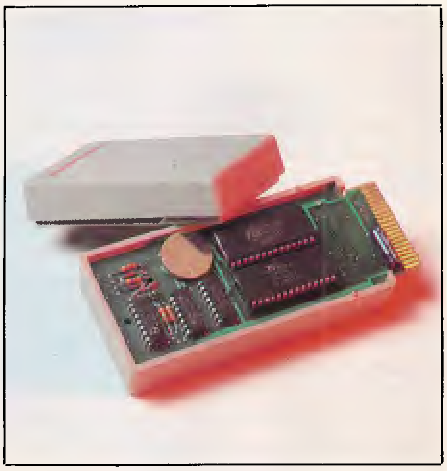
It's interesting to note that the Happy Mac screen can be reached without inserting a disk. On the Macintosh it can't be reached without inserting a good Macintosh system disk, so the emulation sofware must contain some of the boot-up code of an Apple system — something for Apple lawyers to ponder.

After reaching the Happy Mac screen I naively expected to insert a Macintosh system disk and be up and running, but of course things are never that simple. Both the ST and the Macintosh use different format disks, and the very nature of the disk drives makes compatibility impossible. The Atari disk drive is a fixed-speed drive whereas the Macintosh drive is a variable-speed device.

To transfer software to run under Magic Sac, you first need to format some disks in a special 'Macintosh-like' format; a utility is supplied for this. Then you need to connect the serial cable to the modem ports of both machines. Paris Radio supplies ST and Macintosh programs to perform the transfer.

There's no way round using the transfer program for the first transfer of a system disk, but I subsequently found it far easier to use the same Macintosh communications package on both machines. The transfer program supplied does have one advantage — it's a nibble copier. This should be able to copy some of the many copy-protected Mac programs, although that's no guarantee it will run them. Data Pacific is planning to release an Atari hardware modification that will turn the ST into a variable-speed drive, accompanied by a new version of the Magic Sac emulation software which will allow the ST to read Macintosh disks directly.

After all the effort, it's quite an achievement to get a Macintosh desktop up and running. It's possible to configure the kind of Macintosh system the Atari will emulate, via a selection menu that appears just before the switch. The options are: a 128k Mac; a 256k Mac; a 512k Mac; a 512k Mac with a RAM disk; and an 896k Mac. Atari 520 owners will only be able to use Magic Sac in 128k and 256k modes.



The hardware of Magic Sac is nothing more than a standard ST ROM cartridge without any ROMs. Magic Sac Plus, shown here, also has a real-time clock.

The other problem I encountered is that the first release of TOS (Tramiel Operating System) ROMs will not work with greater-than-256k configurations, even on an Atari 1040ST. The second-release ROMs, as used in all except the very early 1040s, work in all five configurations.

The Mac has two serial ports: one is usually assigned to a modem; the other is usually assigned to a printer. It has no parallel port. The Atari has one serial port, usually assigned to modems or printers; and a parallel port, assigned only to printers. When you use the 'printer' port with Mac software on the ST, the data goes to the Atari serial port as you would expect. You can change this by selecting the parallel option on the selection menu.

There are a number of other utilities supplied with the Magic Sac ST disk, including utilities for copying the 'Macintosh-like' ST disks, and a utility for setting and using the real-time clock in Atari ST mode.

In use

The good news is that the Magic Sac not only works, it runs software 20 per cent faster than the Macintosh. It utilises the full 640 × 400 pixel screen of the Atari (compared to the Mac's 512 × 342 pixels) and with an 1040ST, you can have 896k of available memory. The bad news is that, at the moment, it isn't very compatible. When using any application seriously, you get the unnerving feeling that it's just about to crash: you're always waiting for the dreaded diagnostic screen which gives the system status at the time of the crash.

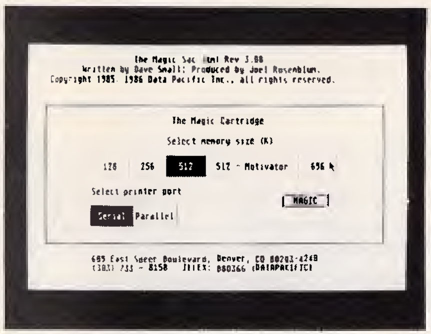
In order for the Magic Sac to run at all, a number of fundamental problems have to be overcome — the most fundamental of which is how does the emulation program run the ROMs. Unfortunately, there isn't much I can tell you about that as the author, David Small, is understandably guarded about how it works. He didn't disclose any more than that it traps all the calls that the ROMs make to another part of the system, and translates them into their Atari ST equivalents.

Other problems can be explained in a little more detail. The Macintosh and the ST differ greatly in how they handle disk ejects. On the Mac a disk eject is automatic, and is only done when the operating system gives permission. On the ST, you can generally eject a disk at any time with the eject button and it won't hurt the disk. If you prematurely eject a disk in Magic Sac mode, you could easily damage it. Furthermore, the damage may be subtle and may not be found until the disk starts to act oddly or has problems reading data files.

To eject a disk using the Magic Sac, you must first ask the Mac system to 'eject' it. The appropriate Mac ROM routine will then be called which cleans up the disk properly and issues an 'eject' request. The emulation captures this request and turns it into a flashing A or B, corresponding to drives A: and B:, in the top right-hand corner of the screen. You can then remove the disk.

The sound chips in the ST and the Macintosh are vastly different in their internal architecture; accordingly, sound is unsupported on the ST. For some reason, turning the sound control on the Macintosh control panel down to zero reduces the crashes caused by programs trying to access sound.

The ST keyboard emulates the Macintosh's surprisingly well. Two Macintosh keys not found on the ST — Command



The Magic Sac [illegible] Rev 3.00
Written by Dave Small; Produced by Joel Rosenblum.
Copyright 1985, 1986 Data Pacific Inc., all rights reserved.

The Magic Cartridge

Select memory size (K)

128 | 256 | **512** | 512 - Motivator | 696

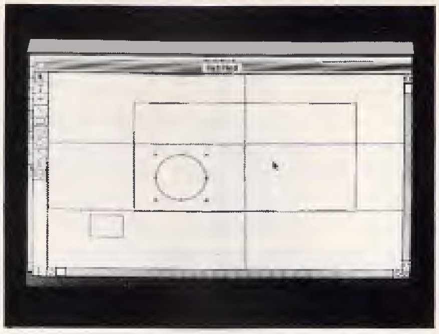
Select printer port

Serial | Parallel

[MAGIC]

685 East Speer Boulevard, Denver, CO 80203-4248
(303) 733 - 8158 TELEX: 880366 (DATAPACIFIC)

A grand total of five Macintosh configurations is available on Magic Sac



MacDraw runs 20% faster via Magic Sac and utilises the Atari's larger screen display

Packages which use resizeable windows will be able to use the larger screen

and Option — are simulated by Control and Alternate. As the Macintosh mouse is a single button mouse, the right-hand button on the ST is redundant.

As well as the sound problems, there are a number of other limitations imposed by the hardware differences. ST owners with colour screens have 200 lines of vertical resolution, whereas the Macintosh needs at least 342 lines. Therefore, the Magic Sac can't be used with an ST colour monitor or TV.

Currently the Magic Sac only supports single-sided disks. It will work OK in a double-sided drive but will only give 400k per disk. Plans are under way to produce a version that will support 800k, double-sided disks on double-sided drives.

Neither does the Magic Sac support Atari, or any other brand, hard disks. Again, in the future, they should be supported.

The Magic Sac requires two Macintosh system software programs — the System and Finder files. The Finder is basically the desktop which appears when you start the system; it manages disk file I/O. The System operates several functions such as fonts, start-up code, various 'system utilities' and desk accessories, and it is used continually.

The Magic Sac works with three versions of the Finder: 1.0, 1.1g and 4.1. Versions 1.0 and 1.1g are best suited to 128k and 256k Mac systems; version 4.1 runs best on 512k systems. It won't work with the latest versions of the Finder (5.0 and greater) which use Apple's hierarchical filing system.

Applications

The official Data Pacific list of compatible and incompatible Macintosh applications is given in the boxes on this page, but my advice is take it all with a pinch of salt. To be classed as a compatible product, it seems that a package has to be capable of five minutes' operation without crashing. The only programs I can recommend as sufficiently robust are MacDraw and MacPaint. If you use anything else, be sure to save your work every five minutes.

For readers with a basic knowledge of Macintosh system software, there are four common reasons why an application causes the Magic Sac to crash. These are:

- passing a zero parameter to a Mac system call. Even on the Mac this is bad news, as it means there's something wrong with the code. However, sometimes the Mac can get away with it because the machine has RAM in location 0 (the system call handler). On the ST, however, it causes an instant bus error, as location 0 is ROM.
- accessing Mac hardware directly. Although programmers have no need to access hardware directly on the Macintosh, some still do. Most popular is direct access to the disk as part of a copy protection scheme.
- assuming the screen is 512 pixels wide (like the Mac) instead of using the system screen size settings.
- trying to access the ROM version.

Conclusion

I'm amazed that the Magic Sac works at all. In its present form, I couldn't recommend it to anyone who wants to do serious work using Macintosh applications. Even the recommended applications work sporadically.

If you're the kind of user who is fascinated by how software works and would enjoy discovering new compatibilities and incompatibilities, then the Magic Sac is a very rewarding product. In six months' time, perhaps, it will be a serious proposition. In the meantime, buy it because it's great fun, and for the pleasure of being involved with its development

Compatible software (as known)

Apple:	Find 1.0, 1.1d and 4.5; MacPaint 1.5; Edit 2.0; MacDraw 1.9; MacProject 1.0; REDIT; disk utility; Switcher 5.01
Others:	Aldus Pagemaker; Assimilations RAM disk; Desktop Software 1st Base 1.01; Bishop Graphics' Quik-Circuit; Haba Systems' Habaterm; Infocom — all products; Manhattan Graphics' Ready-Set-Go 2.1; Megamax C; Microsoft Basic 1.01, 2.0, Excel, Works; Software Arts' TK! Solver

Incompatible software (as known)

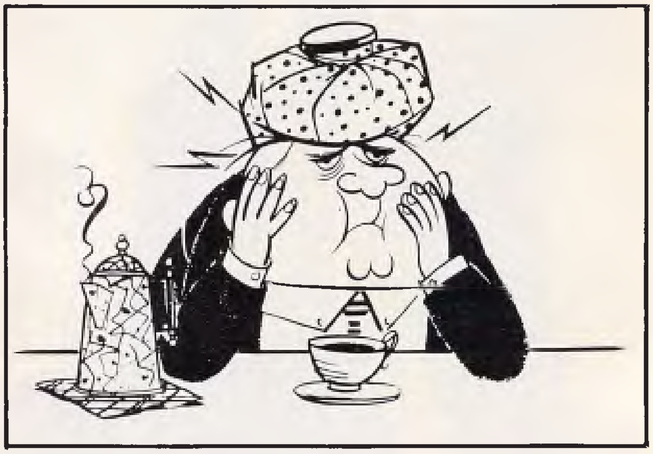
Apple:	Switcher 3.0,3.3, MacTerminal 2.0, MacWrite 4.5
Hayes:	Smartcom 2.0
Microsoft:	Word
Penguin:	Transylvania

Magic Sac costs $400 (including tax) and is available from Paris Radio Electronics. Tel: (02) 344 9111.

END

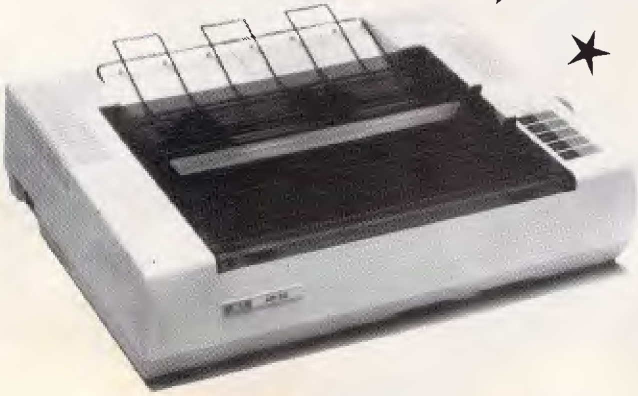
HANGOVER SPECIALS!

If you were too tired and emotional during December to take advantage of our specials, then we have a big bag of goodies for you for '87.



High resolution colour
ADI-PX22 640 x 350 EGA
14″ with tilt and swivel base .. $1050
EGA Video Board emulates CGA
and EGA with 16 colours $550
or both the above $1500

NEW RELEASE



Nakajima Dot Matrix Printers
AR-50 200 CPS 80 col with pull tractor feed, IBM and Epson emulation
near letter quality $799.00
AR-55 as above 132 col ... $999.00

Hales & Rogers
Pty. Ltd.
5 Mobbs Lane, Carlingford 2118
Tel. (02) 858 5322

As usual we can supply Software, Printer Paper, Special Cables, PC/XT/AT plug-in expansion boards, Fanfold Sticky Labels, Floppy Discs & Drives, Modems, NEC & Epson Printers, Laser Printers, Maths Co-processors, Intelligent & Helpful Advice and above all else GREAT SERVICE.
If you can resist all of that but would like to know more just clip the coupon and we will send you our latest price list and newsletter.

To: Hales & Rogers.
Please send me the following item/s.
....
....
....

Name ....
Address ....
.... Postcode ....

☐ Price List & Newsletter only.
Add $5 for each order post & packing.
Cheque enclosed $..................
Please charge my ☐ Bankcard ☐ Master Card
☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
Signature: ____________ Expiry Date: ________
Adco-HR/FP187

Warranty: All products sold are covered by the manufacturer's warranty.
Sales Tax: All prices include sales tax. We can supply tax free, please call for prices.
Sources: All products are sourced from the authorised Australian distributor and carry their full support.
Prices: Are subject to change without notice. Please check before ordering.
Stock: We endeavour to keep stocks of the more popular items at all times. Delivery usually overnight providing your order is in before noon!

GIANT KILLERS

Now there's a new standard that all other business computers, whatever their size, will have to try and match.

Introducing the Toshiba T3100 and T2100, the most exciting new business computers in years.

Both the T3100 and T2100 are so fast, you'll wonder how you coped with any business computer you've ever worked with before.

They have greater versatility than either the XT or the AT (and, of course, they **are** compatible).

Both come complete with a superb plasma screen that sets new standards of clarity and definition for desk top computers.

The Toshiba T3100 features internal hard disk storage and an in-built 720KB disk drive. The T2100 offers the choice of either internal hard disk with a disk drive or dual internal drives. And all of this comes at a price that makes all other business computers as over-priced as they are over-sized.

The new Toshiba T3100 and T2100. Probably the most capable little miracles ever to grace your desk top. Or your top desk drawer. And, like all Toshiba computer products, one less thing to go wrong.

TOSHIBA

Toshiba (Australia) Pty. Limited, Computer Products Division.
84–92 Talavera Road, North Ryde, NSW 2113. (02) 887 6057

Conroy Carpenter TCP 0034

SCREENTEST

Macintosh Turbo Pascal

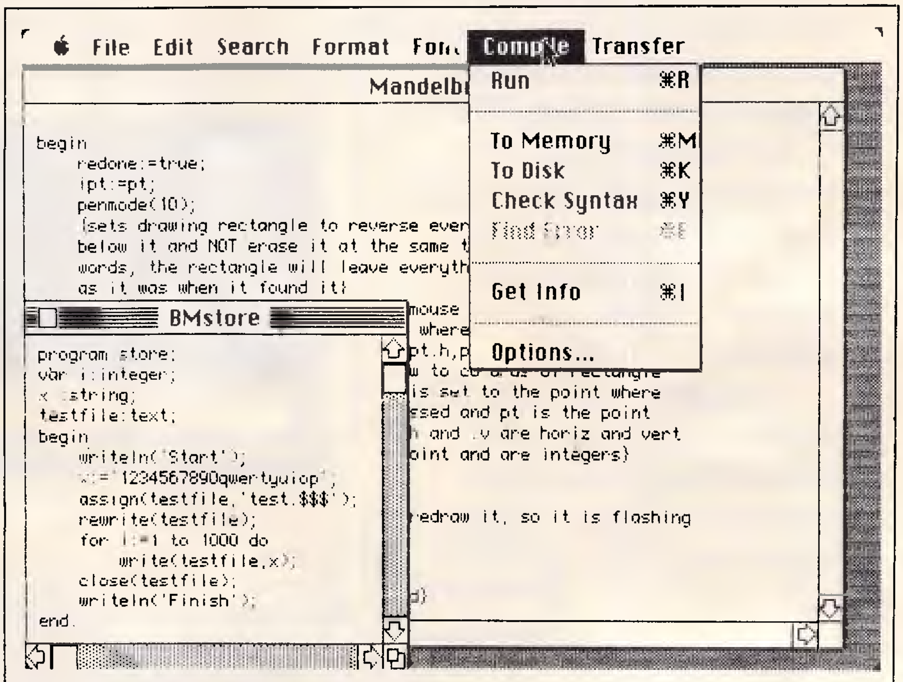
Turbo Pascal's reputation as a cheap but wonderful product will be done no harm by this Macintosh version of the language which uses the original's ease of use to further extend the Mac's programming environment. Owen Linderholm looked it over.

When Turbo Pascal first appeared it was viewed rather sceptically. After all, everyone knew that the only successful way to make money from software was to charge exorbitant prices in order to recoup the enormous development costs. Consequently anything that was cheap had to be nasty, no matter what was claimed. Little did anyone know then that Borland and Turbo Pascal were to turn the software publishing world inside out.

The news slowly trickled out that Turbo Pascal was a good product, then a very good product, and finally the reality sunk home. Here was a highly professional product at a price so low, you might think you were buying a game. From that moment on cheap, good-value software was here to stay, and so was Borland. The company launched several products which all provide important facilities at incredibily low prices.

Recently, though, Borland has begun to show signs of a slight drop in the quality of its software. Turbo Word Wizard was disappointing; Travelling Sidekick was not much more than a gimmick; and a few programs have appeared later than promised. However, more goodies like Turbo Prolog have been produced, and now there's the Macintosh version of Turbo Pascal.

Our version of the program came on two disks: the first disk held the system files and Mac Turbo Pascal itself; the second held demonstration programs, MacinTalk, RMaker, D/A Mover and Unit Mover. MacinTalk is a software speech synthesiser which has been licensed from Apple for personal use *only* with Mac Turbo Pascal. There were none of the usual Borland 'READ ME' files, and none of the extra files such as overlays associated with MS-DOS and CP/M versions of Turbo Pascal. Borland has assured me that the final release will



```
begin
    redone:=true;
    ipt:=pt;
    penmode(10);
    {sets drawing rectangle to reverse ever
    below it and NOT erase it at the same t
    words, the rectangle will leave everyth
    as it was when it found it}
```

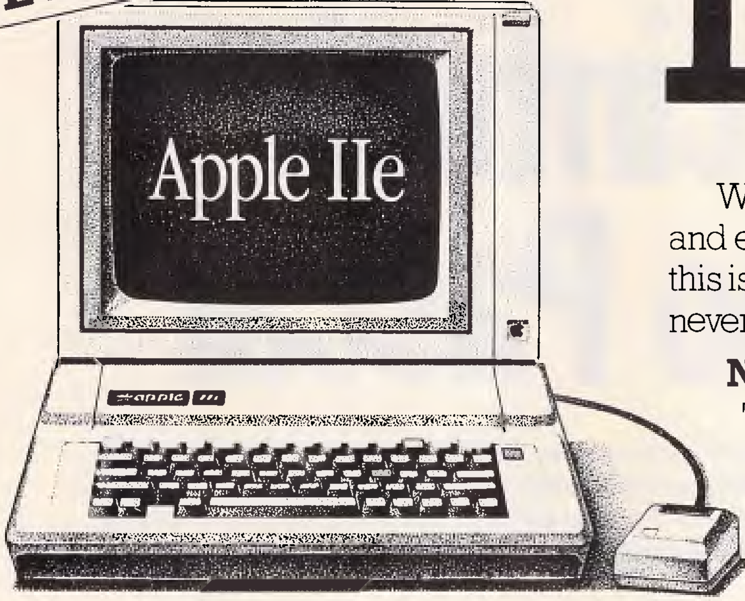
```
mouse
 where
pt.h,p
w to co
is set to the point where
ssed and pt is the point
h and .v are horiz and vert
oint and are integers}

edraw it, so it is flashing
```

```
program store;
var i:integer;
x :string;
testfile:text;
begin
    writeln('Start');
    x:='1234567890qwertyuiop';
    assign(testfile,'test.$$$');
    rewrite(testfile);
    for i:=1 to 1000 do
        write(testfile,x);
    close(testfile);
    writeln('Finish');
end.
```

Example editor screen

What to g
New

NEW LOW PRICE



Save up to $1,825 on an Apple IIe, accessories, and software

Invest in an Apple IIe with colour monitor, disk drive, and extended video and colour text card at the new low price of **$1,995** and you've already saved yourself $800.

But that's only the beginning! You'll also receive the following goodies free:

Apple IIe Mouse, with 'Mouse' and 'Mouse Paint' software worth $225.

Up to $800 cash back from Apple on accessory and software purchases made between now and March 31st, 1987!

With some 10,000 educational, business and entertainment programs, available, this is one present the kids and you will never outgrow.

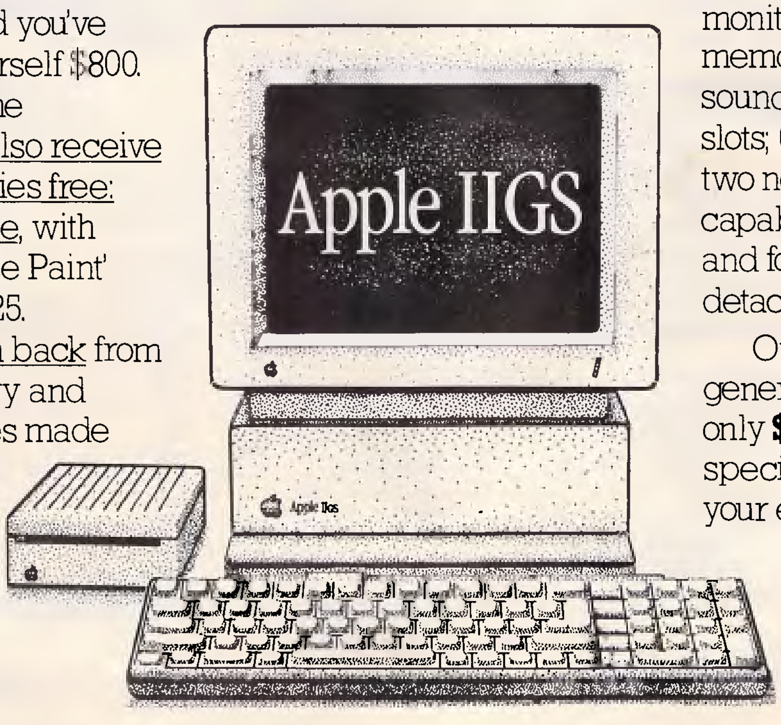
New Apple IIGS

The latest and greatest in a long line of Apple II's.

The GS is compatible with nearly all of the existing Apple II software and peripherals, but now is capable of much more, thanks to its enhanced graphic and sound abilities.

The Apple IIGS 512K Colour System comes standard with 512K of memory (expandable to 1.5 Megabytes); 16-bit 65C816 microprocessor; a 3.5" disk drive; RGB colour monitor; a IIGS 256K memory card; 15 voice sound chip; 7 expansion slots; 6 peripheral ports; two new graphic modes capable of 4,096 colours, and for the first time, a detachable keyboard.

Own this new generation Apple II for only **$3,995.** (Phone for a special trade-in offer on your existing Apple II.)



et for the Year

Authorised Dealer

Save up to $2,676 on a Macintosh, accessories and software

Invest in an Apple Macintosh 512/800 and we'll give you the following free:

Microsoft Works, the very latest integrated software worth **$676.**

For many, Works will be the only software they'll ever need.

Up to $2,000 cash back from Apple on accessory and software purchases made between now and March 31st, 1987!

It's performance and ease of use makes it a perfect choice for business.

Don't miss out on this fantastic offer at only **$3,995.**

Free Software with your new Apple IIc

The stylish and compact Apple IIc has now been improved for even greater performance and ease of use.

Invest in the new Apple IIc with monitor and stand and we'll give you a pack of ten disks full of software free. Take it all with you for only **$1,495.**

Phone now for more information

Don't miss out on these limited summer offers. Phone us on (03) 791 2900 before it's too late.

Robs Computer Centre

295 Thomas Street, Dandenong, Vic. 3175
Phone (03) 791 2900

Ad Shop/Rob 175

have additional documentation files, additional demonstration programs and 'probably some other bits as well'.

In use

The Mac Turbo Pascal program is represented by a smart icon of a hand holding a chequered flag — double-clicking on this starts up the program as usual. The initial display is in the standard style for Mac text editors: one open window labelled 'Untitled', and a menu bar with the options 'File', 'Edit', 'Search', 'Format', 'Compile' and 'Transfer' (see example). The editor makes use of all the Mac's usual facilities — cut and paste, scroll bars, editing with the mouse, and so on. It also has an auto-indent feature that is very easy to use: simply tab to the next stop and all subsequent lines will be indented by the same amount. If you then start a line nearer the beginning than that, all the following lines will start from the new point. I found this easier to use than any other auto-indent I have tried.

In use, the editor is very friendly. I use a Macintosh fairly frequently and Turbo Pascal is by far my favourite programming language when working on MS-DOS machines. The editor somehow seems to combine the best features of Mac editors and the old Turbo Pascal editor: I simply typed in a test program and ran it. As the editor is similar to most Mac text editors, I can't see any current Mac owners having any problem with it.

Another feature of this version of Turbo Pascal is a 'Check Syntax' option under the Compile menu. This checks the syntax of what's in the editor, providing a message about the first error it comes across. This facility is useful when typing in long programs. Just before ending an editing session, you can check the syntax of what you have typed, thereby eliminating any possibility of typing errors causing trouble when you come to compile the program.

Running programs is also incredibly easy. The usual Turbo Pascal method of compiling to memory and executing has been maintained. Compilation speed is extremely fast, so much so that even long files only take a couple of seconds. While compilation takes place, the pointer is changed to a small, chequered flag which waves back and forth as an indication that something is happening. When compilation has finished, execution proceeds immediately. When the program has finished running, control returns to Mac Turbo Pascal. If a run-time error has occurred, Mac Turbo Pascal recovers and makes an attempt to determine what caused the error, returning to the editor with the offending section marked.

Due to this recovery facility and the friendliness of the Macintosh environment, this version of Turbo Pascal seems to be even more interactive than the original. I would even feel confident breaking all the rules for simple programs by typing them in and running them until they're debugged, *without* saving to disk.

The demonstration programs that came with our version were obviously designed to show off the use of as many Mac features as possible. Most impressive were a sound program, developed from an original by Mac guru Andy Hertzfeld; an event-driven programming tutor; and a couple of programs written to demonstrate the 3D routines that Borland has included. Borland tells me that the final release will have more demonstration programs as examples.

The Macintosh is a very versatile machine, and the environment in which a program runs can vary considerably. The default for all Mac Turbo Pascal programs is a window that emulates a scrolling 80 × 25 character screen. Unfortunately, I could find no easy way, either from the example programs or from the sparse documentation, to produce the graphical equivalent — a 320 × 200 pixel screen with simple point and line commands as in Graph-Mode and Plot (x,y) in the MS-DOS version of Turbo Pascal. The *only* provision for simple graphics are the extremely complex but powerful QuickDraw routines.

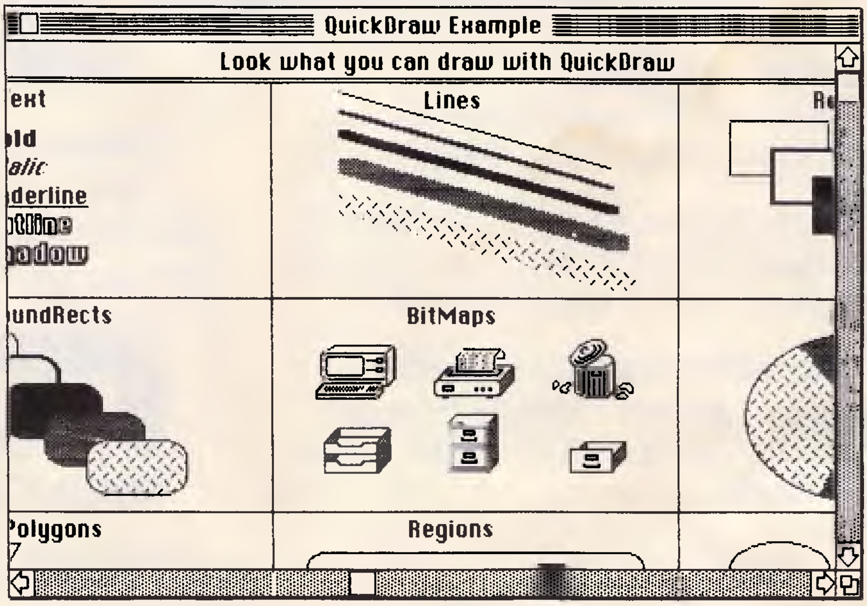
Having said that, it isn't all that difficult to create such an environment, but I was a little disappointed that Borland hadn't included something automatically. What it has done is to include turtle graphics toolbox with the release version. This toolbox should be a step in the right direction and will also be a very good precursor for further graphical toolboxes.

The language

Without the final documentation I can't be sure, but the syntax of this version seems to conform to standard Turbo Pascal. The only differences that I could discover were the addition of a new data type and associated functions, and a slightly different implementation of reals. The new data type is Longint, which is a 4-byte integer value ranging from -2^{31} to $2^{31}-1$. Other similar data types can be converted to this data type too. This is an extremely useful addition to the language, since the range limitations of standard integers can be an annoying problem.

Reals have been implemented using SANE (Standard Apple Numeric Environment) which is part of the operating system. This introduces two extensions to real numbers: the first is a special value representing infinity, while the second is a value representing something that is not a number.

Turbo Pascal differs from standard (ISO) Pascal in a few areas. These are essentially differences that reflect usage on a micro system, and are concerned with file I/O and buffers. Turbo Pascal also has some extensions to standard Pascal; all these are fully covered, with examples, in the documentation.



Here is an example of the variety of graphical output that can be achieved using the QuickDraw routines in Turbo Pascal

FREE POSTAGE FOR ORDERS OVER $75 & UNDER 3kg!!

Where else can you buy top quality disks at these prices?!

XIDEX DISKS AT INCREDIBLE PRICES!

All prices per 10 disk boxes!

Our Cat. Number	Product's Code	Description	1-9 Boxes	10+ Boxes
		XIDEX 3½" DISKS		
C12600	3012-3000	S/S	$55.95	$53.95
C12602	3022-3000	D/S	$69.95	$65.95
		XIDEX 5¼" DISKS		
C12401	5012-1000	S/S D/D 40 track	$29.95	$28.95
C12410	5022-1000	D/S D/D 40 track	$38.95	$36.95
		XIDEX 5¼" HIGH DENSITY DISKS		
C12412		D/S High Density	$79.95	$69.95

VERBATIM DISKS AT INCREDIBLE PRICES!

Our Cat. Number	Product's Code	Description	1-9 Boxes	10+ Boxes
		VERBATIM 3½" DISKS		
C12610	MF350	S/S D/D 80 tracks/135 TPI	$54.95	$52.95
C12612	MF360	D/S D/D 80 tracks/135 TPI	$59.95	$55.95
		VERBATIM 5¼" DATALIFE DISKS		
C12501	**MD525-01**	**S/S D/D soft sector 40 track**	**$27.95**	**$26.95**
C12504	**MD550-01**	**D/S D/D**	**$34.95**	**$32.95**
C12505	MD550-10	D/S D/D 10 sectors 40 tracks	$61.20	$56.95
C12507	MD577-01	S/S D/D soft sectors 80 tracks	$61.20	$56.95
C12510	MD557-01	D/S D/D soft sectors 80 tracks	$75.60	$68.95
		VERBATIM 5¼" VALULIFE DISKS		
C12421		S/S D/D	$22.95	$21.95
C12421		D/S D/D	$29.95	$26.95
		VERBATIM HIGH DENSITY 5¼" DISKS		
C12520	**MD/HD**	**D/S H/D soft sector**	**$79.95**	**$69.95**
		VERBATIM 8" DISKS		
C12811	DD34-4001	D/S D/D	$69.60	$67.50
C12814	DD34-4026	D/S D/D	$69.60	$67.50
		HEAD CLEANER DISKS		
C12551		5¼"	$11.75	$ 9.95
C12851		8"	$14.95	$12.95

Now you can buy absolute top quality 5¼" disks that are also the cheapest in Australia!! They even come with a 5 year guarantee, which indicates the quality of the Microdot disks. So why pay 2-3 times the price for the same quality as Microdot?

CHECK THESE PRICES!

DESCRIPTION	1-9 BOXES	10+ BOXES
5¼" S/S D/D	**$14.95**	**$13.95**
5¼" D/S D/D	**$18.95**	**$17.95**

(SEND $2 FOR SAMPLE DISK!)

EVEN LESS FOR "NO FRILLS" DISKS!

Bulked packed, Microdot D/S D/D without boxes, or labels, or brand name, just their white card jacket!

1-99 DISKS	100+DISKS	1,000+DISKS
$16.95	**$15.95**	**$14.95**
(PER 10 DISKS)	(PER 10 DISKS)	(PER 10 DISKS)

(SEND $2 FOR SAMPLE DISK!)

(TAX EXEMPT PRICES LESS 20¢ PER DISK)

3½" "NO FRILLS" DISKS!

(AVAILABLE MID JANUARY)

Bulked packed, D/S D/D disks with white boxes, but no labels or brand name. (These are a top name brand, but we can't tell you which.)

1-99 DISKS	100+DISKS	1,000+DISKS
$47.50	**$45.50**	**$42.50**
(PER 10 DISKS)	(PER 10 DISKS)	(PER 10 DISKS)

(SEND $5 FOR SAMPLE DISK!)

(TAX EXEMPT PRICES LESS 40¢ PER DISK)

RETAIL INQUIRIES: Rod Irving Electronics,
MELBOURNE, 48 A'Beckett St. Phone (03) 663 6151
NORTHCOTE 425 High St. Phone (03) 489 8866
MAIL ORDER: (03) 543 7877 or P.O. Box 620, CLAYTON 3168

WHOLESALE INQUIRIES: Ritronics Wholesale, 56 Renver Rd. CLAYTON 3168. Phone (03) 543 2166.

FREE POSTAGE FOR ORDERS OVER $75 & UNDER 3kg!!

FREE POSTAGE FOR ORDERS OVER $75 & UNDER 3kg!!

FREE POSTAGE FOR ORDERS OVER $75 & UNDER 3kg!!

FREE POSTAGE FOR ORDERS OVER $75 & UNDER 3kg!!

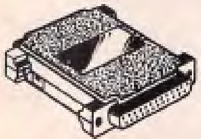
FREE POSTAGE FOR ORDERS OVER $75 & UNDER 3kg!!

CENTRONICS GENDER CHANGERS

- Female to Female.
- Saves modifying or replacing non-mating Centronics cables.
- All 36 pins wired straight through.

Cat. X15660 **Male to Male**
Cat. X15661 **Male to Female**
Cat. X15662 **Female to Female**

Normally $33.95,
Our Price $24.95



RS232 GENDER CHANGERS

- Saves modifying or replacing non-mating RS232 cables.
- All 25 pins wired straight through

Cat. X15650 **Male to Male**
Cat. X15651 **Male to Female**
Cat. X15652 **Female to Female**

Normally $19.95 each
Our Price $14.95

RS232C NULL MODEM ADAPTOR

- Male to female connections
- Pins 2 and 3 reversed
- All 25 pins connected

Cat. X15657 **Male to Male**
Cat. X15658 **Male to Female**
Cat. X15659 **Female to Female**

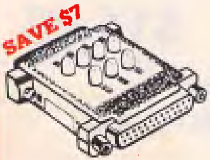
Normally $22.95
Our Price $14.95

RS232 MINI PATCH BOX

- Interface RS232 devices
- 25 pin inputs
- 25 leads with tinned end supplied
- Complete with instructions

Cat. X15653 **Male to Male**
Cat. X15654 **Female to Male**
Cat. X15655 **Female to Female**

Normally $25.95
Our Price $19.95



RS232 MINI TESTER

- Male to female connections
- All pin wired straight through
- Dual colour LED indicates activity and direction on 7 lines
- No batteries or power required

T.D. Transmit Data
D.S.R. Data Set Ready
R.D. Receive Data
C.D. Carrier Detect
R.T.S. Request to Send
D.T.R. Data Terminal Ready
C.T.S. Clear to Send

Cat. X15656 ...... **Normally $39.95**
SPECIAL, ONLY $32.95

RS232 WIRING ADAPTOR BOX

- Male to female
- 25 Detachable plug on leads
- 2 mini jumpers
- Ideal for experimenting or temporary connections

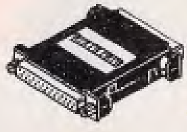
Cat. X15665 ...... **Normally $39.95**
SPECIAL $29.95

MAINS MUFFLER

Sudden mains disturbances can seriously affect your computer equipment, and stored data. So why risk it when you can have a Mains Muffler, particularly whan the cost of one failure is likely to be greater than the purchase price! So vanish those dangerous clicks and voltage spikes forever with the Mains Muffler!

SPECIFICATIONS:
Maximum total load:
1000W 4 AMP 250V 50Hz
Outlet Sockets
Attenuation: 150KHz - 47dB
500KHz - 68dB
10MHz - 66dB
Dual T Section:
VDR Transient suppression
Surge capacity 200 Amp 8 x 20uS

2 WAY Cat. X10089 .... **$249**
4 WAY Cat. X10090 .... **$299**

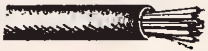


RS232 INLINE SWITCHING BOX

- 25 pin "D" plug to 25 pin "D" socket
- DIP switches allow easy switching of internal wiring.

Cat. X15662 .... **$32.95**

PERIPHERALS GALORE!!



COMPUTER CABLE

CIC6 6 conductor computer interface cable. Colour coded with braided shield.
(to IE422 specifications).
Copper conductor 6 x 7/0.16mm.

1-9 metres	10+ metres
$1.90/m	**$1.70/m**

CIC9.100 9 conductor computer interface cable. Colour coded with mylar shielding. 9 x 7/0.16mm.

1-9 matres	10+ metres
$2.50/m	**$1.95/m**

CIC12 12 conductor computer interface cable. Colour coded with mylar shielding. 12 x 7/0.16mm.

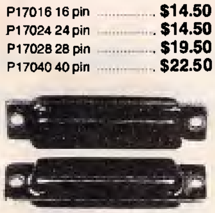
1-9 metres	10+ metres
$2.70/m	**$2.50/m**

CIC16 16 conductor computar interface cable. Colour coded with mylar shielding. 16 x 7/0.16mm.

1-9 metres	10+ metres
$3.90/m	**$3.40/m**

TEXTOOL SOCKETS

P17016 16 pin	**$14.50**
P17024 24 pin	**$14.50**
P17028 28 pin	**$19.50**
P17040 40 pin	**$22.50**



DB CONNECTORS

Cat. No.	Description	Price
P10880	DE9P Male	$1.95
P10881	DE9S Female	$2.25
P10882	DE9C Cover	$1.20
P10884	DE9P R.A. Plug	$3.65
P10885	DE9S R.A. Skt	$4.25
P10890	DA15P Male	$2.10
P10891	DA15S Female	$2.25
P10892	DA15C Cover	$1.25
P10894	DA15P R.A. Plug	$4.25
P10895	DA15S R.A. Skt	$5.00
P10900	DB25P Male	$2.75
P10901	DB25S Female	$2.95
P10902	DB25C Cover	$1.25
P10904	DB25P R.A. Plug	$4.50
P10905	DB25S R.A. Skt	$5.95

IBM* XT & AT COMPATIBLE EXTENDED KEYBOARD (105 KEYS)

These new keyboards are both XT and AT compatible!

- 20 Dedicated function keys
- Enlarged "Return" and "Shift" key
- Positive feel keys
- Low Profile Design, DIN standard
- Separate Numeric and Cursor control keypads
- Additional Functions... Key-in-lock, Audio Beep, Previous Word, Next Work, Fast Repeat, Line Feed, Pause, Clear Screen, Reset.

Cat.X12022 .... **only $249**

SWIVEL BASE

Make life easier with tnese quality, swivel and tilt bases, complete with rubber fittings!

Cat. D11100 .... **$29.50**

SEMICONDUCTORS!

Always check with us before you buy!

	1-9	10+	100+
2716	$9.95	$9.50	$8.95
2732	$8.95	$8.50	$7.95
2764	$7.95	$7.50	$6.95
27128	$6.95	$6.50	$6.25
27256	$11.50	$10.50	$10.00
4116	$3.95	$3.50	$2.95
4164	$2.95	$2.75	$2.50
41256	$5.95	$5.50	$4.95
555 8pin	0.50	0.40	0.35
6116	$3.95	$3.75	$3.50
6264	$6.50	$5.50	$5.25
6802	$5.00	$4.00	$3.75
6821	$2.00	$1.80	$1.70
6845	$5.00	$4.00	$3.75
7406	$0.40	$0.30	$0.25
8250	$29.95	$27.95	

NE5534AN

SCOOP PURCHASE!!!

1-9	10+
$1.95	**$1.85**

WORLD MODEM CHIP

Cet. U21614 .... Normally $49.50
Save $25, SPECIAL $24.95

MEL9501

Have you blown up your Apple drive by plugging it in backwards or not turning off the power while changing boards? We have the MEL9501 chip!

SPECIAL, ONLY $29.95

8087

Genuine Intel chips with manual and data sheets packed in boxes!

8087-3 (4.77MHz)	$299
60B7-2 (8MHz)	$399
8087-1 (10MHz)	$649
80287-3 (6MHz)	$499
80287-7 (8MHz)	$699
8087-3 (4.77MHz)	$299

SPEECH SYNTHESISER CHIPS!

SPO256A-AL2: Speech synthesiser chip, needs programming to work.
.... **$16.95**

CTS256-AL2: Contains the code recognition circuit to enable the project to plug directly on the printer port, or into an IBM PC.
.... **$29.95**

A SET OF EACH . $44.95

PRINTER RIBBONS

CP80, BX80, DP80, BX100, MB100
ALL A CRAZY LOW $9.95

APPLE* COMPATIBLE CARDS

Printer Card Cat. X17029	$89
Drive Card Cat. X17019	$79
80 Column Card Cat. X17025	$85
Speech Card Cat. X17009	$69
Music Card Cat. X17011	$99
Super Serial Cat. X17035	$129
RGB Card Cat. X17039	$79
Z80 CP/M Card Cat. X17041	$59

APPLE IIe COMPATIBLE CARDS

80 Column/64K Card X17061 **$89**

IBM* XT COMPATIBLE CARDS

Colour Graphica Card	Cat. X18002	$129
Graphics Card (Herculea compatible)	Cat. X18003	$175
Floppy Disk Drive Controller Card (2 Drives, 16 Bit)	Cat. X18005	$129
Floppy Disk Drive Controller Card (4 Drives, 16 Bit)	Cat. X18006	$99
High Reaolution Mono Card	Cat. X18007	$199
Colour Graphics & Printer Card	Cat. X18010	$169
768kB RAM Card (without memory)	Cat. X18012	$99
Printer Buffer Card	Cat. X18017	$37.50
Game I/O Card	Cat. X18019	$39.50
XT Motherboard (without memory)	Cat. X18020	$225
Clock Card	Cat. X18024	$59.50
RS232 Card (without cable)	Cat. X18026	$79.50
RS232 & Clock Card	Cat. X18028	$99
XT Turbo Motherboard (without memory)	Cat. X18030	$275
Multi I/O & Disk Controller Card	Cat. X18040	$199
I/O Plus Card	Cat. X18045	$139
768K Multifunction I/O Card (includes cable but not 41258 RAM)	Cat. X18050	$199
Hard Disk Controller Card	Cat. X18060	$299
Enhanced Graphics Adaptor Card	Cat. X18070	$499

(AT COMPATIBLE)

Enhanced Graphics Adaptor Card (Award Bios)	Cat. X	$495

D LINK NETWORK CARDS

Complete with software. Also runs PC-NET®. 1M/Bit per second data transfer rate via 2 wire link. Dedicated server not necessery. Up to 255 stetions.

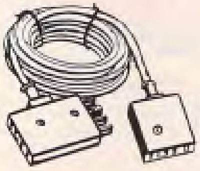
.... **$695**

TELEPHONE EXTENSION CABLE UNIT

Allows 15 metres of telephone extension cable to be neatly wound into a protable storage container. The reel sits on a flat base and has a handle to wind cable back on to it after use. No tangles - no mess! Ideal for the workshop, around the house, office, pool etc.

Cat. Y16013 .... **$24.95**

MAIL ORDER HOTLINE
(03) 543 7877
(2 lines)



TELECOMMUNICATIONS AUSTRALIAN STYLE ADAPTOR CABLE

- Australian socket to plug/socket
- Length 10 metres

Cat. Y16015 .... **$15.95**

U.S. TELEPHONE EXTENSION CABLE

- U.S. plug to 2 U.S. sockets
- Length 10 metres

Cat. Y16028 .... **$10.95**

U.S. TELEPHONE EXTENSION CABLE

- U.S. plug to U.S. socket
- Length 10 metres

Cat. Y16024 .... **$8.95**

TELEPHONE CURL CORD

- U.S. plug to U.S. plug
- Replacement hand set cord
- Length 4.5 metres

Cat. Y16023 .... **$7.95**

TELEPHONE ADAPTOR

- Australian plug to U.S. socket
- Length 10cm
- Cream colour cable

Cat. Y16026 **$6.95**

RS232 DATA SWITCH WITH TESTER

- No power required
- Ideal for 1 computer to 2 peripherals or 2 computers to one peripheral.
- 25 pin RS232 "D" connectors,
- Six dual coloured LED indicators showing certain flow status:

T.D. Transmit Data
R.D. Receive Data
R.T.S. Request To Send
C.T.S. Slear To Send
D.S.R. Data Set Ready
D.T.R. Data Terminal Ready

- Size: 200(W) x 68(H) x 150(D)mm

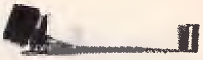
Cat.X19110 .... **R.R.P. $169**
Our Price $149

PRINTER LEAD FOR IBM*

- To suit IBM* PC XT and clones.
- 25 pin "D" plug on computer end to Centronics 36 pin plug
- Length 2 metres

Cat. P19029

1-9	10+	100+
$19.95	**$17.95**	**$15.95**



COMPUTER LEADS

CL2

- 9 pin 'D' plug to 9 pin 'D' plug
- All pins wired straight through (removable terminals)
- Length 1.5 metres

Cat. P19033 **$14.95**

CL3

- 9 pin 'D' plug to 9 pin 'D' plug
- All pins wired straight through (removable terminals)
- Length 3 metres

Cat. P19035 **$17.95**

CL5

- 9 pin 'D' plug to 9 pin 'D' socket
- All pins wired straight through (removable terminals)
- Length 3 metres

Cat. P19036 **$17.95**

CL7

- 15 pin 'D' plug to 15 pin 'D' plug
- All pins wired straight through (removable terminals)
- Length 3 metres

Cat. P19016 **$24.95**

CL8

- 15 pin 'D' plug to 15 pin 'D' socket
- All pins wired straight through (removable terminals)
- Length 3 metres

Cat. P19017 **$27.95**

CL10

- 25 pin 'D' plug to 25 pin 'D' plug
- Pins 1 through to 8 and 20 wired straight through (removable terminals)
- Length 1.5 metres

Cat. P19011 **$26.95**

CL11

- 25 pin 'D' plug to 25 pin 'D' plug
- Pins 1 through to 8 and 20 wired straight through (removable terminals)
- Length 3 metres

Cat. P19009 **$23.50**

CL12

- 25 pin 'D' plug to 25 pin 'D' plug
- Pins 1 through to 8 and 20 wired straight through (removable terminels)
- Length 7.5 metres

Cat. P19037 **$25.95**

CL13

- 25 pin 'D' plug to 25 pin 'D' socket
- Pins 1 through to 8 and 20 wired straight through (removable terminals)
- Length 3 metres

Cat. P19020 **$29.95**

CL21

- 25 pin 'D' plug to 25 pin 'D' plug
- All pins wired straight through (removable terminals)
- Length 1.5 metres

Cat. P19007 **$33.95**

CL22

- 25 pin 'D' plug to 25 pin 'D' plug
- All pins wired straight through (removable terminals)
- Length 3 metres

Cat. P19008 **$41.95**

CL23

- 25 pin 'D' plug to 25 pin 'D' socket
- All pins wired straight through (removable terminals)
- Length 3 metres

Cat. P19012 **$42.50**

CL25

- 36 pin Centronics plug to 36 pin Centronics plug
- All pins wired straight through
- Length 2.13 metres

Cat. P19014 **$49.95**

CL27

- Apple II, IIe, II+, with parallel interface card
- Dual 10 pin (20 contacts) connector to Centronics 36 pin plug
- Length 2.4 metres

Cat. P19025 **$29.95**

CL28

- Apple III with universal parallel interface cerd
- Dual 10 pin (20 contacts) on Apple end to Centronics 36 pin plug
- Length 2.4 metres

Cat. P19026 **$29.95**

CL30

- Tandy II/12/16/16B/2000, with dual 17 pin female on computer end to Centronics 36 pin plug. (Equivalent to 26-1323)
- Length 2.4 metres

Cet. P19027 **$33.95**

CL31

- Tandy I/III/4/4P, with 34 pin edge connector on computer end to Centronics 36 pin plug. (Equivalent to 26-1401)
- Length 2.4 metras

Cat. P19026 **$37.95**

POSTAGE FOR ORDERS OVER $75 & UNDER 3kg!!

JUMBO 5¼" DISK STORAGE

If you've got lots disks, you'll appreciate the extra capacity of this disk storage unit when it comes to locating "that" disk!

Features...
- 100 disk capacity
- Smoked plastic cover
- Lockable (2 keys supplied)
- 9 Dividers/spacers

C16020 .... **only $24.95**
C16027 (Hinged Lid) **$26.95**

5¼" DISK STORAGE

Efficient and practical. Protect your disks from being damaged or lost!

Features...
- 70 disk capacity
- Smoked plastic cover
- Lockable (2 keys supplied)
- Dividers/spacers

Cat C16025 ...... **only $24.95**

5¼" DISK STORAGE

Efficient and practical. Protect your disks from being damaged or lost!

Features...
- 50 disk capacity
- Smoked plastic cover
- Lockable (2 keys supplied)
- Dividers/spacers

Cat. C16030 ...... **only $19.95**

3½" DISK STORAGE UNIT

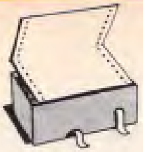
- Holds up to 40 x 3½" diskettes
- Lockable (2 keys supplied)
- High impact plastic lid and base
- Anti static

Cat. C16040 ...... **only $19.95**

3½" DISK STORAGE UNIT

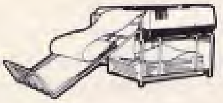
- Holds up to 40 x 3½" diskettes.
- Lockable (2 keys supplied)
- High impact plastic lid and base

Cat. C16035 ...... **only $19.95**



COMPUTER PAPER

Quality paper at a low price! 2,500 sheets of 11 x 9½", 60 gsm bond paper.
Cat. C21003 **Normally $49.95**
SPECIAL, ONLY $44.95



PAPER TAMER

- Restores order to the top of your desk or work area
- Made of white plastic coated steel
- Stores up to 900 continuous sheets
- Allows perfect paper feed
- Allows easy examination of print out

C21050 .... **Normally $59.95**
Special, only $49.95
(Printer and paper not included)

CANON A-40 PRINTER

- Serial impact Dot Matrix
- 140 C.P.S
- Near Letter Quality Mode
- 1.4K Buffer

Cat. C20040 .... **$525**

SUPER 5 EP-1090 DOT MATRIX PRINTER

- 80 C.P.S.
- Pica or Elite character set
- 9 pin head
- 100 million character life

Cat.C20030 ...... **only $435**

SUPER 5 EP-1201 DOT MATRIX PRINTER

- 120 C.P.S.
- Pica or Elite character set
- Print Modes: NLQ, Dot Graphics, Proportional Font, Draft.
- Proportional Printing
- Reliable and Compact
- Proportional Printing
- Logic Seeking
- 1K Printer Buffer

Cat. C20035 ...... **only $595**

2 & 4 WAY RS232 DATA TRANSFER SWITCHES

If you have two or four compatible devices that need to share a third or fifth, then these inexpensive data transfer switches will save you the time and hassle of constantly changing cables and leads around.

- No power required
- Speed and code transparent
- Two/Four position rotary switch on front panel
- Three/Five interface connections on rear panel
- Switch comes standard with female connector

2 WAY Cat.X19120 ~~$125~~ **$100**
4 WAY Cat.X19125 ~~$145~~ **$115**

2 & 4 WAY CENTRONICS DATA TRANSFER SWITCHES

Save time and hassles of constantly changing cables and leads around with these inexpensive data transfer switches. These data switches support the 36 pin centronic interface used by Centronics, Printronics, Data Products, Epson, Micronics, Star, and many other printer manufacturers.

- No power required
- Speed and code transparent
- Two/Four position rotary switch on front panel
- Three/Five interface connections on rear panel
- Switch comes standard with female connector
- Bale locks are standard

2 WAY Cat.X19130 ~~$125~~ **$100**
4 WAY Cat.X19135 ~~$145~~ **$115**

SAKATA HIGH RESOLUTION COLOUR MONITOR

High quality IBM* compatible monitors, great with VCR's too!

SPECIFICATIONS:
CRT: 13", 90° deflection colour
Input Signal:
Video Signal: Separate video signal
Video: Positive
Sync.: Positive
Input Level: TTL Level
Scanning Frequency:
Horizontal: 15.7KHz
Vertical: 60Hz
Display Size: 245(H) x 182(V)mm
Resolution:
Horizontal: 640 dots
Vertical: 200 lines
Size: 343(H) x 362(W) x 421(D)mm
Weight: 11.6kg
Cat. X????? **$695**

NEW YEAR SALE!!

SAMSUNG TTL MONITOR

A quality 12" TTL monitor, with a high contrast, non-glare screen at a vary reasonable price!

SPECIFICATIONS:
Picture Tube: 12" diagonal 90° deflection
Phosphor: Green (P39)
Mode: TTL
TTL Input Signal:
Poloarity: TTL Positive
Level: 4V p-p + −1.5V
Impedance: 75ohm
Active Video Period:
Horizontal: 44.25 uS maximum
Vertical: 18.98 mS maximum
Video Band Width: 16 MHz (−3dB)
Scanning Frequency:
Horizontal: 18.432 + −0.1KHz
Vertical: 50 HZ + −0.5%
Active Display Area:
216(H) x 160(V)mm
Display Characters: 80 characters x 25 lines
Input Connector: 9 pin connector
Controls:
Front; Power ON/OFF, Contrast.
Rear; V-Hold, V-Size, Brightness
Internal; Vertical Linearity, Horizontal Linearity, Horizontal Width, Focus.

Description	Cat.No.	1-9	10+
Green	X14517	$199	$189
Amber	X14518	$199	$189

RITRON 2 MONITORS

Stylish, swivel base monitor, available in amber or green.
Green Cat. X14506 **Normally $235**
Amber Cat. X14508 **Normally $239**
SPECIAL, ONLY $199

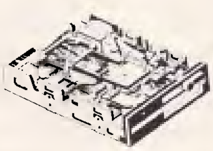
IBM* AT COMPATIBLE!

Assembled & Tested in Australia!
- 6 MHz
- 80286 CPU
- 8 slots
- 1 M/Byte main board
- 1.2 M/Byte Floppy disk drive
- 20 M/Byte Hard disk
- Colour graphics display card
- Floppy and Hard disk controller card
- Printer card and RS232
- 200W Power supply
- Keyboard
- Manual

All this for just $3,995
(Monitor not includad)

20 M/BYTE HARD DISK DRIVE FOR IBM* AND COMPATIBLES

Includes hard disk controller card.
Cat. X20010 .... **WAS $1,250**
SPECIAL, ONLY $995
*IBM is a registered trade mark.



NEC DISK DRIVES

5¼" SLIMLINE
Double sided, double density, 1 M/Byte unformatted.
Cat. C11906 .... **$295**

8" SLIMLINE
Double sided, double density, 1.6 M/Byte unformatted.
Cat. C11908 .... **$795**

IBM* COMPATIBLE DISK DRIVES

Tired of paying out more for Japanese Disk Drives? We now have "direct import" Taiwanese disk drives at much lower prices!

Cat.No.	Deacription	Prica
C11801	500K	$199
C11803	1 M/Byte	$239
C11805	1.6 M/Byte	$259

APPLE* COMPATIBLE SLIMLINE DISK DRIVE

Japanese Chinon mechanism.
compatible with Apple 2+
Cat. X19901 .... Normally $225
SPECIAL $195

IBM* XT COMPATIBLES from $795*

Assembled & Tested In Australia!
3 Months Warranty!

***$795:** 256K RAM Single Driva, Graphics and Disk Controller Card.

256K RAM: 2 Disk Drives, Multifunction Card, Colour Graphics, Disk Controller, 1 Parallel Port. .... **only $1,095**

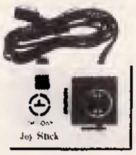
640K RAM: 2 Disk Drives, Multifunction Card, Colour Graphics, Disk Controller, 2 Serial, 1 Parallel Port. .... **only $1,195**

JOYSTICK FOR IBM

Features Selectable "Spring centering" or "free floating". Electrical trim adjustments on both axis.
360 degree cursor control
Cat. C14205 .... **$49.95**

APPLE* COMPATIBLE JOYSTICK FOR 2C & 2+

Ideal for games or word processing. Features include selectable "spring centring" or "free floating".
Electrical trim adjustments on both axis, 360° cursur control and dual fire buttons
Cat. C14201 .... **$49.95**



APPLE* COMPATIBLE JOYSTICK

Ideal for games or word processing. Fits most 6502 "compatible" computers.
Cat. C14200 .... **$39.95**

DELUXE JOYSTICK

Suits Commodore 64, VIC-20, Atari, Sears, NEC PC-6001 computers or video games.
Cat. C14220 .... **$14.95**

TTL MONITORS

Fantastic resolution! Enjoy a crisp, sharp image with the latest Ritron TTL monitor! IBM* compatible, green display, swivel and tilt base.
Green Cat. X14510 **Normally $289**
Amber Cat. X14512 **Normally $289**
SPECIAL, ONLY $269

INTRA 14" RGB COLOUR MONITOR

Resolution: 640 x 200 dots
Display Format: 80 x 25 characters
Display Colours: 16
Dot pitch: .39mm
Sync Horiz. Scan Freq: 15.75 KHz
Sync Vert. Scan Freq: 50Hz
Band Width: 18MHz
Cat. X14520 .... **$695**

INTRA 14" RGB HIGH RESOLUTION COLOUR MONITOR

Compatible with IBM* and compatibles, and EGA Cards.
Why pay more?
Resolution: 640 x 350 dots
Dot pitch: .31mm
Display Format: 80 x 25 characters
Cat. X14514 ...... **Normally $1,095**
Our price $995

rie

Rod Irving Electronics

48 A'Beckett St, MELBOURNE
Phone (03) 663 6151

425 High St, NORTHCOTE
Phone (03) 489 8866

Mail Order and Correspondence:
P.O. Box 620, CLAYTON 3168

Telex: AA 151938

MAIL ORDER HOTLINE
008 335757
(TOLL FREE)
(STRICTLY ORDERS ONLY)

LOCAL ORDERS & INQUIRIES
(03) 543 7877

POSTAGE RATES:

$1 – $9.99	$2.00
$10 – $24.99	$3.00
$25 – $49.99	$4.00
$50 – $99.99	$5.00
$100 – $199	$7.50
$200 – $499	$10.00
$500 plus	$12.50

FREE POSTAGE FOR ORDERS OVER $75 & UNDER 3KG!!

The above postage rates are for basic postage only. Road Freight, bulky and fragile items will be charged at different rates.

Certified Post for orders over $100 included free!
Registered Post for orders over $200 incuded free!

All sales tax exempt orders and wholesale inquiries to:
RITRONICS WHOLESALE,
56 Renver Rd, Clayton.
Ph. (03) 543 2166 (3 lines)

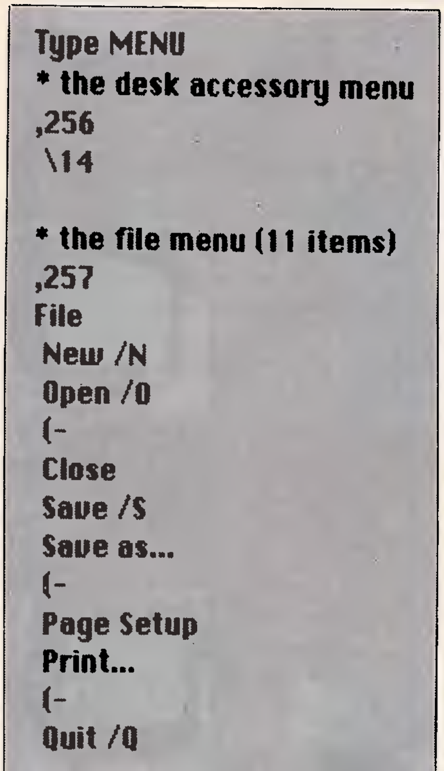
Errors and omissions excepted

*Apple and IBM are registered trade names

VISA

FREE POSTAGE FOR ORDERS OVER $75 & UNDER 3kg!!

FREE POSTAGE FOR ORDERS OVER $75 & UNDER 3kg!!



```
Type MENU
* the desk accessory menu
,256
\14

* the file menu (11 items)
,257
File
 New /N
 Open /O
 (-
 Close
 Save /S
 Save as...
 (-
 Page Setup
 Print...
 (-
 Quit /Q
```

Section of a resource file. This sets up two menus on the menu bar: the first is the Apple menu with desk accessories; the second is the standard file menu. The resource file is compiled by RMaker and used by the compiler directive $R. Note the '/' convention to denote option key short-cuts

The major addition to this Macintosh version of Turbo Pascal is the concept of units, which are like those in UCSD Pascal and are also vaguely similar to modules in Modula-2. Borland informs me that Turbo Pascal 4.0 for other machines will also incoporate units.

A unit, in basic terms, is a predefined extension to the language. Each unit is a selection of constants, data types, variables, procedures and functions that have been previously defined and compiled. When a unit is used by a program the relevant sections of code are added to the program. Constants, variables and other names go in the symbol table, procedures and functions are added to the code, and so on. Units have significant advantages over 'include' files.

Units consist of two parts — implementation and interface. The interface is made up of the declarations in the unit and shows which data types, constants, variables and names are used and needed by the unit. The implementation is the actual code of the unit and is invisible to the calling program. It can also contain local information that is invisible to the calling program. The idea behind this is that a finished unit can be used by anyone since the procedure names, and so on, are visible to anyone, but the source code is hidden. This is useful when different people are developing an application since it prevents one programmer hacking around with another's code and confusing everyone.

The purpose of units is to keep associated functions together so that it becomes easy to add them in groups or omit things that aren't needed. Several of the units are inter-dependent and require the use of other units.

Mac Turbo Pascal comes with 16 standard units which deal with interfacing the language to the facilities of the machine. Five of these are loaded automatically unless specifically excluded, and provide the standard 80 × 25 text window, low-level support routines, data type conversion, dynamic memory conversion, I/O routines and device drivers. The other units are for interfacing with the Macintosh ROM routines, such as QuickDraw, the Toolbox and other Mac OS routines. Other units implement full 3D graphics operations, an AppleTalk interface and an interface to MacinTalk.

It's also possible to create your own units to provide a sensible, modular way of dealing with programs, especially when developing routines to provide specific facilities. For example, I lamented the lack of simple graphics routines earlier. These could be implemented on top of QuickDraw from a user-defined unit that opened a graphics window and inserted simple point and line-plotting routines from QuickDraw.

Mac Turbo Pascal also allows you to use externally developed assembly language programs, although they must be in MDS (Macintosh Development System) format. Machine code can also be included from within Mac Turbo Pascal in a similar way to ordinary Turbo Pascal.

Writing applications

This is an area which affords the average programmer some difficulty. Making proper use of menus, icons, windows, events, the mouse, desk accessories, resource files, and so on, involves a considerable amount of knowledge about how such things work, how the Mac works, and even the philosophy behind it all. In practice, most developers start with the book *Inside Macintosh* and then turn to its various alternatives in horror. They end up back with *Inside Macintosh* and try again.

It would be misleading to pretend that anyone could make full use of the Macintosh without reading *Inside Macintosh,* and Borland hasn't made that mistake. The company makes no bones about the fact that if you want to do serious development work on the Mac, then you will have to read *Inside Macintosh, Macintosh Revealed,* and other reference works.

However, Borland has tried to make things as easy for you as possible. The documentation I received contained some examples and skeletons for Macintosh applications, and tried to lead you through the various mazes as simply as it could. Borland has also assured me that there will be more examples and more skeleton applications in the final product. The company made it quite clear that it realised the importance of helping users to understand how to control the Macintosh user interface.

I'll be honest and admit that I wasn't able to leap straight in and program in friendly menus and scrolling windows right away, but then not only do I not have *Inside Macintosh,* I didn't have much documentation for the routines either.

But I did manage to get my test program to work — this was a version of the Mandelbrot and Julia set program given in Program File (see page153). Even the original didn't have all the flashy facilities it could have had, especially with regard to putting the graphical output in a window. I set myself the task of converting only the Mandelbrot set part of the program to Mac Turbo Pascal without the additional menu option. I not only managed to get the program going, but I also retained the zoom facility which allows you to zoom in further on the current plot by dragging a rectangle around an area of the plot with the mouse. Not too surprisingly, the Pascal version ran much faster. A finished plot can now take as little as an hour, whereas the Basic version takes about 10 times as long.

I'm convinced that if I'd had the time to do a little research into QuickDraw, for example, I would have had no trouble making the program reasonably friendly. The manual goes to a great deal of trouble to explain the importance of event-driven programming and how it should be done. 'Event-driven' programming is where a program responds to external events rather than trying to control events; the program should respond instantly when the mouse moves up to the menu bar or clicks on window controls. In standard programming practice, this would be done by continually checking up on the mouse, interrupting the other tasks the program has to perform. The Macintosh operating system can, however, keep track of all this for you and only interrupt the main program when a specified event occurs. Event-

Toshiba – your PC partner in prosperity

T1100 Plus – Battery Powered Super-portable

When you need a battery powered PC, the new Toshiba T1100 Plus offers more features for less:

- Double the speed 7.16/4.77MHz processor
- 256K RAM (expandable to full 640K)
- 2 x 720K 3.5 inch floppies
- High contrast LCD display
- 20% lighter and smaller than IBM Convertible

LATEST TECHNOLOGY
LCD DISPLAY DELIVERS
HIGHEST CONTRAST
PLUS WIDE
VIEWING ANGLE

1. T2100, the no-compromise desktop compatible

Toshiba's alternative to bulky, old fashioned desktop PCs. The square plasma displays deliver superior resolution to conventional monitors. You get twice the performance in a tiny package.

- Twice the speed – superior 8086-2 processor
- Twin 720K floppies, 10MB hard disk available.
- Superb 640x400 pixel screen

2. T3100, the only PC/AT that doesn't take over your desk!

The T3100 gives you more power than an IBM PC/AT in a lean, 15 pound package.

- 10MB hard disk and 720K floppy drive
- Fast 4/8MHz 80286-2 processor

3-in-One printers – only Toshiba has them

Toshiba's 3-in-One printer technology gives you speed, letter quality type and high-resolution graphics. All in one highly reliable printer. Which may be why more people choose Toshiba's 24-pin printers than any other.

And now you can get this proven technology in a new compact printer, the 321. At a compact price.

Whichever Toshiba printer you choose, they're all fully PC compatible and ultra quiet – perfect for every office.

P321 series

P351 MkII/P351C
And now even faster, at 300cps

SANT TECHNOLOGY

Sant Technology Phone (02) 597 2355, (02) 588 1913. Suite 3, 58 Bay Street, Rockdale 2216

- ☆ Finance available
- ☆ Quantity discounts available – call for further pricing
- ☆ Many items not list are available, please call for details
- ☆ Prices subject to change without notice

Please send me further information on ____________

Name ____________
Company ____________
Address ____________
____
Phone ____________

Computer Lighthouse
Authorised Dealer
Professional Solutions
Come in and see the new
Apple II GS
We deal in Apple only.
Come and talk to the specialists.
High level OMNIS developers.
MacMRP & MacPathology.
FISCAL specialists.
Ask about our *Budget Fighting* accounting solution.

You will find us at two convenient locations:
91 Phillip St., Parramatta
Ph. 633 2373
&
320 High St., Penrith
Ph. (047) 31 4429
Ph. (047) 31 4744

Laser Printing
direct from disk or by modem
Now you can produce truly presentation-quality type and design your own layouts for printing. Send your Mac, IBM PC or WP disk or take advantage of our typing, design and assembly services. You'll be delighted with the results and amazed at the cost savings.
Download and print from Mac disk from $1 per A4 page
☎ (02) 94 5207 now for a free quotation
MacBureau

driven programming makes use of this facility and you are put in charge of a sophisticated multi-tasking system.

The final stage in mastering Macintosh programming is writing a desk accessory. This is also covered in the manual and rounds off a comprehensive tour of programming the Mac's capabilities. My main concern about Mac Turbo Pascal's coverage of programming the more advanced features of the Mac is that most programmers will eventually need to refer to one of the reference works on Mac programming. This isn't the fault of the program, however, but the cost of programming a powerful and sophisticated machine in a powerful and sophisticated way.

Turbo Pascal is, in fact, an almost ideal environment for Macintosh program development, since it was always intended that this machine should be programmed in Pascal. All the operating system routines were written to interface easily with Lisa Pascal, Apples' original develoment language.

Borland has included three extra programs to assist in programming in the Macintosh environment. These are: UnitMover which aids in the creation and use of units; Font/DA Mover which helps create desk accessories; and RMaker

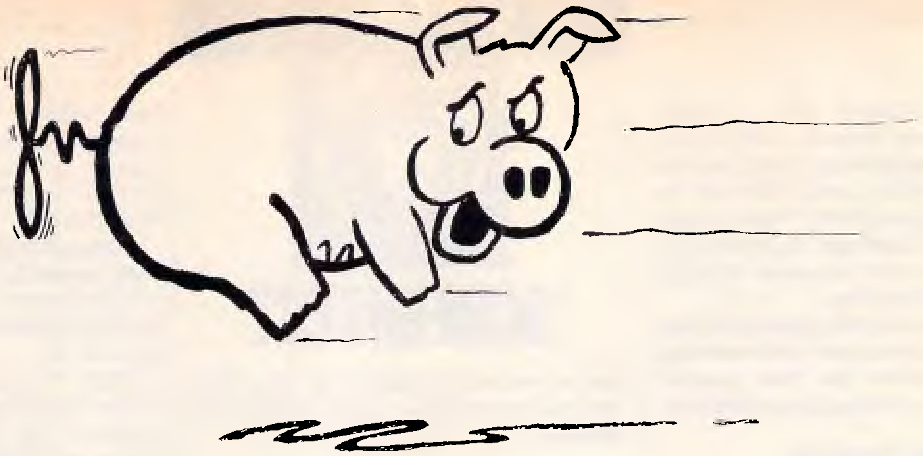
Benchmarks

intmath:	0.043secs (timed by doing a loop to 30000 and dividing the result by 30)
realmath:	4.6 secs
triglog:	8.4secs
textscrn:	51.5secs
grafscrn:	15.1 secs (not an ideal Benchmark result — I was unable to set it up properly within a graphics window)
store:	10.4secs

Final version Benchmarks may differ from these review copy results

```
{#############################  ReSize  ###############

{  Called on a mouse-down in the grow box, this allows the user to change
 the size of the window.  We change the size, then
 claim that the whole of the window contents is no longer validly drawn,
 because we're too lazy to do so for just the scroll bar regions
 that are actually subject to change.  See the Window Manager.}

PROCEDURE ReSize(a_window : WindowPtr; downPt: Point);

 VAR w, h : integer;         {new width and height of the sized window}
    newSize : longint;      {the new size}

 BEGIN {ReSize}

    newSize := GrowWindow(a_window, downPt, growRect); {find new size}
    w := LoWord(newSize); {find the width}
    h := HiWord(newSize); {find the height}

    SizeWindow(a_window, w, h, true); {change to the new window size}

    {place whole window into update region to be sure it all gets updated.
     This is more than is strictly necessary, but a lot easier than just
     invalidating the regions that actually may have changed.}
    InvalRect(a_window^.portRect);

  END; {ReSize}
```

A section of code from one of the demonstration programs. It shows how Macintosh functions can be easily accessed from Turbo Pascal and how complicated those functions can be



and pigs fly backwards...

At Software Express, we don't talk crap. If you're after straight advice and honest low prices, we think you'll like us. Our service is personal and relaxed. We even allow you to sit down and leisurely flick through manuals. Our sales people are not the pushy type, just informative. Our mail order customers don't miss out either. We're quite happy to promptly forward further information on any of our products. We also have overnight delivery for just $5! And perhaps most importantly, Software Express' honest low prices! Proof that service need not cost an arm and leg.

At Software Express, pigs don't fly backwards!

MAIL ORDER
HOTLINE
(03) 663 6580

SOFTWARE Express

AI
SPECIALS
Smalltalk V $245
TransLISP $170
Prolog $125

48 A'Beckett St, Melbourne 3000. Phone (03) 663 6580

Please Note: All of our prices include the new 20% sales tax.

BRIEF

The latest and best program editor! Brief offers the features most asked for by professional programmers. In fact Brief has just about every feature you've ever seen or imagined, including the ability to configure windows, keyboard assignments and commands to your preference. Reviewers at Byte, Infoworld, Dr.Dobb's Journal and Databased Advisor all agreed that Brief is best! $410

C COMPILER

Version 4, Microsoft's latest C compiler with Code View Debugger $780

COPY II PC

Make back up copies of protected software! $99

DS BACKUP+

Powerful hard disk backup facility. 10 M/Bytes in 5 minutes. Not copy protected. $175

LOTUS 1-2-3

The worlds top selling spreadsheet $695

MACE UTILITIES

Speed up the operation of your hard disk. Makes all files contiguous. Unformat an accidently formatted hard disk. Remedy and reclaim. $150

MACRO ASSEMBLER 4.0

The latest assembler for the serious developers. Includes LINK, MAKE, CREF and SYMDEB. The all new advanced debugger will operate with symbols, step through source code and swap screens between commands and program output. $355

MICROSOFT MOUSE

Put the screen in the palm of your hand with the Microsoft Mouse. Includes PC Paintbrush. $295

MICROSOFT WINDOWS

Allows you to integrate the many tasks you perform with your computer $195

NORTON COMMANDER

A quicker way to run programs and take charge of your computer. Point and shoot operation, create menus. $149

NORTON UTILITIES

Use Norton Utilities to locate files, track down your data and put disks in order. Complete hard disk support. $149

PC ALIEN

Over one hundred disk formats available with this amazing software exchange program! $109

PC INTRO

Specially designed for the complete novice! $95

PC TUTORIAL

A complete guide to using and programming the IBM PC and close compatibles. $105

QUICKBASIC 2

Basic fans will appreciate this fast Microsoft compiler and editor that will give you the development ease of the industry standard. BASIC interpreter at compiler speeds. $189

SMALLTALK V

Explore Artificial Intelligence on your PC with this brilliant new program! $245

TRANS LISP

A "COMMON LISP" compatible tutorial, interpreter, debugging, and pretty printer plus a fast, full screen editor, samples and help. $170

TURBO PASCAL 3.0

TURBO	$89
TURBO 8087/BCD	$139

TURBO PROLOG

Brings 5th generation super-computer power to your PC in a new, natural, and logical way. $125 which creates resource files to control icons, pull-down menus, and so on. These can all be accessed from the Mac Turbo Pascal editor, and files can be transferred back and forth. There are also extra compiler directives to inform the compiler about the existence of such things as resource files.

As an addition to the aforementioned documentation, an appendix gives listing for all the units so that their detailed workings can be thoroughly understood.

Speed and power

Compilation speed is incredibly fast. Unlike many other powerful compilers, there isn't time to go and have a cup of coffee while the machine churns away — there isn't even time to stand up and stretch.

Execution speed is much harder to judge. I managed to run the new *APC* Benchmarks (see p193 in Nov. issue) and got some pretty impressive results (see the 'Benchmarks' box). Expecially impressive is the integer math Benchmark which give the quickest result of any machine so far tested, with two other machine/language combinations close and the rest nowhere. The other Benchmark results are also pretty quick, though less impressive (It should be noted that the results may differ slightly in the final version).

Documentation

I'm confident that the quality of the final documentation will be the same as in all previous Borland products — excellent.

Price

The unofficial price of Mac Turbo Pascal in Australia is $179.

Conclusion

Mac Turbo Pascal has achieved a good balance between the Macintosh and the original Turbo Pascal. The feel of the program is similar to the original, and good use of the Macintosh features has been added. The language has been extended to include units, and it looks as though Borland will extend the CP/M and MS-DOS versions of Turbo Pascal in line with this.

Units will make Turbo Pascal an extremely convenient development language, since standard modules of routines can be created and used in any programs that need them.

A little of the potential success of Mac Turbo Pascal has been lost because the program has been so long in coming. There are already rivals available in the US, and it remains to be seen if Borland's decision to wait until it was happy with the product will pay off. I'm sure it will, in view of Borland's track record.

My biggest disappointment was the lack of simple graphics routines in the copy I reviewed, but I am assured that these will be included in the release copy.

My overall impression was of a very good product offering excellent value for money. Whatever the minor failings of Mac Turbo Pascal, the advantages are far too good to be ignored. If I owned a Macintosh, I'd buy it.

END

SUPER-PC/XT

(Model SPCXT-002) $1195 TAX INCL.

Including:
- 8088 CPU on 8 slot Japanese MB (4.7 MHz)
- 640 KB of RAM
- Socket for 8087 and ROM Extensions
- Twin National (Japan) Floppy Disk Drives (DSDD, 360 KB formatted each drive)
- Your choice of Colour Graphic Adapter (CGA) or Hercules Compatible Mono Graphics (HGC)
- Multi I/O with:
  - — Parallel/Serial/Game Ports
  - — Socket for Second Serial Port
  - — Real time clock/calendar, battery backup
- IBM-PC/AT style keyboard
- 150 Watt-165 Watt switching power supply

Option
TPCXT-002: Turbo 4 Layer, 4:7/8 MHz
$1345
- Hardware/software switch to turbo mode
- Can format/disk copy in turbo mode
- All other features are the same as for SPCXT-002

DEALER
ENQUIRIES
WELCOME

SUPER-PC/AT

(Model TPCAT-010) $2595 TAX INCL.

Including:
- 80286 CPU on 8 slot MB (6/8 MHz)
- One Megabyte of RAM
- Socket for 80287 and ROM Extension
- One High Density (1.2 MB) TEAC Floppy Drive
- **Hard disc controller built In**
- Your choice of CGA or HGC
- Parallel port
- Serial port
- Real time clock/calendar with battery backup
- Robust 'IBM-PC/AT' style keyboard
- 200 Watt switching power supply

Option
(Enhancement on **Super-PC/AT**)
- Add one DSDD (360 KB) FDD $200
- Add one High Density (1.2 MB) FDD $350
- Add 20 MB **Seagate Hard Disc** $750

WE ALSO OFFER LOWEST PRICE ON PERIPHERALS (tax included):

* TTL or Composite monitors	$180	* 8087 Co-processor (XT)	$240
* Colour monitors	$595	* 80287 Co-processor (AT)	$495
* Epson LX-86 Printer W Cable	$495	* 10 Nashua DSDD diskettes	$25
* Super-5-1201 Printer W Cable	$495	* Mouse (Bus or Serial)	$140

* 20 MB hard disc (Seagate or micro sci) with DTC (USA) controller $895

CALL US FOR A PACKAGE DEAL — NOW

SUPER PC Personal Computers

273 HUNTINGDALE RD OAKLEIGH VIC 3166 TEL 03 543 7136

TAS + T.M. has no equal

TAS – Plus is faster, easier and cheaper. Simply the most advanced database software of the 80's.

TAS – Plus Relational Database gives you everything you need to quickly and easily create your own database applications. It combines the power of a Relational Database and 4th Generation Language with the ease of a built-in Screen Painter and Program Generator. You literally paint the screen and TAS – Plus writes the program for you.

Whether you're a novice or a seasoned pro TAS – Plus is the product that meets your needs no matter your experience or requirements.

Database

- Save up to 65,000 records in one file (limited by disk space and operating system).
- Find any record in a file in less than 3 seconds.
- Number of fields per record is limited only by operating system.
- Up to 254 characters per file.
- Up to 16 files open at same time.
- Up to 16 key fields per field.
- Up to 10,254 characters per record.
- Field type may be alpha, numeric, date or time.
- TAS – Plus Data Dictionary maintains all data file structures in one handy location.
- Dates use only 4 characters of storage.
- Numeric fields stored in BCD format (a 10 digit number uses only 5 characters of storage).
- Numbers can be up to 20 digits long and have up to 8 significant digits to right of decimal place.
- Print reports to screen, printer or disk.
- TAS – Plus program can exchange standard ASCII data with other programs. Convert Dbase III data files to TAS – Plus and vice versa.

Procedural Language

- Up to 4,500 command lines per program.
- Up to 255 named fields per program.
- Key files not counted as open file. All data file keys stored in one index file (opened automatically with data file).
- Powerful B-TREE file structure allows you to search on any one of 16 key fields per record without sorting.
- Up to 16 screen/report formats per program.
- Allows numeric and string arrays of up to 255 elements each.
- Gosubs may be nested 10 deep.
- Up to 10 nested parentheses per expression.
- Structures may be nested 10 deep.
- True recursion capabilities (subroutine can call itself).
- If command allows true if/then/else programming.
- If comparison types include less than, less than or equal to, equals, equal or greater than, greater than, and not equal to.
- Multiple company capabilities allow up to 1,369 different sets of data files to be accessed by the same programs.
- TAS – Plus has 86 commands (plus several options on many commands).
- Supports date and time arithmetic.
- Context sensitive help messages are easily added to applications.
- Find command can search for exact match, partial match, next record, previous record, beginning of file, end of file or related field between two files.

Compiler

- TAS – Plus compiler converts TAS applications into fast running pseudocode (executable by TAS – Plus run-time).
- Automatically checks program for syntax errors and command usage problems as it is compiled. Helps catch "bugs" before they become problems.
- Automatically checks to make sure files used exist in data dictionary or are defined in application.
- Compiled run-time programs are automatically compacted so they take up less disk space.
- TAS – Plus allows you to create run-time versions of your applications that are separate from the source code (perfect for program developers who intend on selling finished products).

Screen Painter

- Create screens that will look identical to your applications.
- Easily add color or graphic characters to your screen by making menu choices.
- Automatically create programs by "painting" the screen and allowing TAS – Plus to write the program.

Source Code Editor

- Displays all TAS – Plus commands in plain English.
- No need to memorize difficult syntax. The Editor displays all options and makes sure you make all required entries.

Report Writer

- Create and run reports quickly and easily.
- Columns can be totalled.
- Up to 10 different fields may be used as selection criteria in each report.
- Reports may be run over again and again.
- Report programs can be modified using the source code editor.

Other Utilities

- Browse utility lets you display 10 records at once, choosing which fields and in which order to display them.
- Maintain database lets you add change or delete records in a file.
- Create database adds a new database definition to the TAS – Plus dictionary and allows immediate entry of data.
- All utilities are menu driven and require no programming knowledge.

The Accounting Solution

Now solved is the problem of rigidly fixed off the shelf software. Source Code and the powerful TAS – Plus Developers Database are included – so programs can be easily modified as your needs change. Single and Multi User.

Modifiable Accounting

Includes General Ledger, Accounts Payable, Accounts Receivable and TAS – Plus Developers Version. Source code included.

Advanced Accounting

Includes all in Modifiable Accounting plus Sales Order, Purchase Order and Inventory. Source code included.

Developer's Version

For those who need even more power, there's the Developer's Version of TAS – Plus Relational Database. It offers everything that the standard package includes, plus a Programmer's Toolkit. It's the perfect addition for those persons developing sophisticated applications.

The Programmer's Toolbox allows the user to access features not normally available on a database/language. Primary among these are the ability to access additional blocks of program memory (up to 96K), to access files using variable file numbers (even if file names are unknown), and to directly control the memory stack (pop the stack). You can also have up to 17 million records per file and 32 Indexes per record.

Developer's Version also includes a Trace Utility that lets you place break points in your source code (for easier debugging). The Trace Utility includes: set break points, examine/change field value, and single step execution and Enter other character to continue normal operations.

For those who want to use a standard ASCII editor, the Developer's Version provides a complete cross listing of TAS – Plus commands plus a straight forward method of manually writing code. This includes a way of incorporating both screens and reports into the actual code.

Developer's Version includes these additional commands:

binary character
close variable file
display memory
file name search
fill memory
find rec var file
memory ptr update
memory space update
move string
open variable file
pop stack
print screen
ready find field
trace enable

TAS – Plus Commands

The TAS-Plus language commands are listed below in alphabetical order:

bell
clear array
clear buffer
clear line
clear screen
close non-tas file
close tas file
company code
compile program
cursor on/off
date
define field
delete record
delete file
display array
else
enter
equals
equals active records
equals day
equals location
equals month
equals portion of
equals record num
equals size
equals total records
fill field
find record
for/next
get character
get field from buffer
gosub
goto
if
if carriage return
if duplicate
if rec not found
initialize file
justify field
line label
menu
mount
on value
open non-tas file
open tas file
print chr$
print black lines
print box
print message
print on
print outside window
print report line
print set
print vertical tab
put field in buffer
put portion of
read non-tas rec
redisplay screen
reenter field
remark
rename file
return
reindex file
run dos command
run non-tas program
run tas program
save record
save screen
screen lock/unlock
scroll
set color
set file active
set video highlight
set video normal
set video reverse
structure start
structure stop
time
top of form
trap
trim field
upcase field
while
window
wrap print
write non-tas rec

TAS – Plus **$199**
Developer's Version **$569**
(Multi user $869)
Modifiable accounting **$999**
(Multi user $1,299)
Advanced accounting ... **$1,429**
(Multi user $1,729)

TAS – Plus comes with a 30 day money back guarantee (less $25 handling fee). TAS – Plus is available for the IBM PC/XT/AT and compatible computers.

Call our ORDER HOTLINE. Use your Visa, Mastercard or American Express to order today.
Ph. (08) 211 7922

YES! Rush me the following items

Qty.	Item	Price	Subtotal

Shipping add $8 Shipping ____
Tax exempt No. or add 14% Tax ____
($Aust. funds only) Amount Enclosed ____
Payment: VISA MC AMX Cheque
Credit Card Expiration Date: ____
Card Number: ____
Name On Card: ____
Signature ____

Name: ____
Address: ____
____ P/code:
Phone: ____

Send to:

Australasian Distributor
COMPUTER BUSINESS
SYSTEMS PTY. LTD.
217 GOUGER STREET
ADELAIDE
S.A. 5000

ALSO AVAILABLE FROM TRIUMPH ADLER AND OTHER REPUTABLE COMPUTER DEALERS
DEALER, V.A.R. AND O.E.M. ENQUIRIES WELCOME.

THE FOLLOWING ARE REGISTERED TRADEMARKS OF THESE COMPANIES: TAS – PLUS, THE ACCOUNTING SOLUTION, BUSINESS TOOLS, INC.; IBM PC/XT/AT, INTERNATIONAL BUSINESS MACHINES CORP.

FREE CATALOGUE!
SEND SELF-ADDRESSED
A4 SIZE ENVELOPE WITH $1.00 STAMP

DISCWARE
the best amongst the best

KAYPRO PC
the non-obsolescence PC

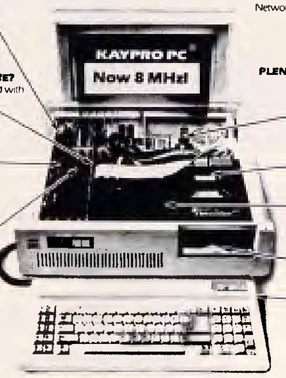
NEXT YEAR'S TECHNOLOGY?
That's easy Replace the existing IBM PC/XT board with an IBM PC AT-compatible board, available now; IBM 32-bit standard, available soon; or whatever the future holds

MEMORY-HUNGRY SOFTWARE?
The Discware Kaypro comes standard with 768 KB — and if that's not enough plug in an Above Memory board of your choice

HIGH-RESOLUTION GRAPHICS?
KAYPRO's standard multivideo board features perfect monochrome clarity plus high-resolution colour (IBM CGA) But, if it's IBM EGA that you want? — simply snap in a board

FURTHER SYSTEM EXPANSION?
But of course! The KAYPRO PC is ready for anything With six available slots, add what you need — networking, modems, more memory — the sky's the limit

MONITOR
A large range of monochrome and colour monitors available.



NOVELL ADVANCED NETWARE
Network your Kaypros with Novell Advanced Netware/0 Let us design a network application for your business needs

PLENTY OF STANDARD FEATURES?

POWER SUPPLY:
A generous 132 watts of power for even the most demanding hard drive

FLOPPY DISK DRIVES:
Dual IBM-compatible floppy disk drives standard or side in the drive of your choice

HARD DRIVE EXPANSION:
Space provided for easy additions of internal hard drives

BUNDLED SOFTWARE:
A full selection of business software for today and tomorrow

KEYBOARD:
Detachable, IBM PC AT-style keyboard with security keylock

The Discware Guarantee

Not only does the Kaypro PC carry 12 month warranty, but, Discware offers an unprecedented support plan.
Should your Kaypro PC malfunction during the warranty period we will either replace or repair the faulty computer on the spot.
And we provide hot line support free of charge.

TOSHIBA T3100
the AT for those on the go

CPU:	8 MHz 80286.
RAM:	640 KB expandable internally to 2.5 MB.
ROM:	IBM AT compatible.
DISK STORAGE:	720 KB 3.5″ floppy disk drive, one 10 MB hard disk, connection for external 1.2 MB/360 KB 5.25″ floppy disk drive.
EXPANSION:	Internal expansion slot.
INPUT/OUTPUT:	Serial and parallel ports.

KAYPRO 286i
the world's first AT compatible

CPU:	8.0 MHz 80286.
RAM:	640 KB expandable to 15 MB.
ROM:	IBM AT compatible.
DISK STORAGE:	1.2 MB floppy disk drive, one 30 MB High Speed hard disk.
EXPANSION:	Eight expansion slots.
INPUT/OUTPUT:	1 each serial and parallel ports.
POWER:	185 watt power supply.

KAYPRO 386
the mean machine

CPU:	16 MHz 80386.
RAM:	1 MB 32 Bit wide RAM, expandable to 16 MB.
ROM:	IBM AT compatible.
DISK STORAGE:	1.2 MB floppy disk drive, one 40 MB High Speed hard disk.
DISK CONTROLLER:	IBM AT compatible disk controller supporting up to two (2) floppy disk drives and two (2) hard disks of up to 130 MB each.
EXPANSION:	Six available expansion slots: one 32 Bit, three 16 Bit and two 8 Bit. Room for 5 half height devices.
INPUT/OUTPUT:	1 each serial and parallel ports on the motherboard.
POWER:	215 watt power supply.

DISCWARE

5th Floor, 3 Smail Street, Broadway NSW 2007 Tel: (02) 212 6933

DISCWARE
Australia's Number ~~1~~ 2 dealer

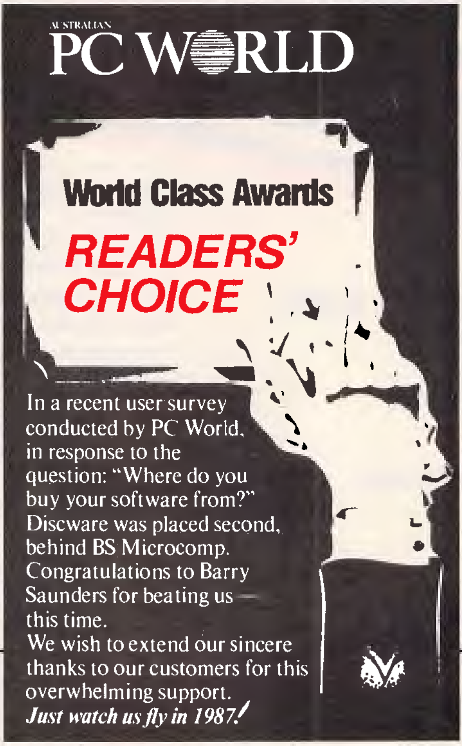
Olivetti M24 Hard Disk $5490
640KB RAM, 20MB internal hard disk, 360KB floppy disk drive, parallel and serial ports, hi-res green or amber monitor, 6 month warranty.

Inboard 386/AT $ Call
Feel the power! The state of the art high performance 32 bit 16 MHz plug in board for the AT.

Hyperace 286 + 10 MHz $799
The Australian designed speed-up card.

Clipper Autumn '86 $ Call
The multi user version now available.

EGA Monitor and Card $1,425



In a recent user survey conducted by PC World, in response to the question: "Where do you buy your software from?" Discware was placed second, behind BS Microcomp. Congratulations to Barry Saunders for beating us — this time.
We wish to extend our sincere thanks to our customers for this overwhelming support.
Just watch us fly in 1987!

The SBT Database Accounting Library in dBASE III.
Free source code in every box.

dProfessional Time and Billing	$695
dOrder Sales Order Processing	$395
dInvoice/dStatement Accounts Receivable/Inventory Control	$595
dPurchase Purchase Order	$395
dPayable Accounts Payable	$595
dLedger General Ledger/Finance	$695
dAssets Asset/Depreciation	$595
dProject Project/Job Accounting	$695
dBackup Menu/Backup	$ 99

Multi-user version available

IBM SOFTWARE

	R.R.P.	Our Price
Borland's Superkey	169.00	119.00
Clipper Compiler dB III	1349.00	899.00
Copywrite	**125.00**	**95.00**
Crosstalk XVI	**315.00**	**199.00**
dBase III plus	**1470.00**	**945.00**
Fastback	299.00	250.00
Framework 2	**1395.00**	**1050.00**
Graftalk 4.08	**1350.00**	**1199.00**
Harvard Total Project Manager	1049.00	699.00
Harvard Presentation Graphics	849.00	569.00
Lattice 'C'	995.00	875.00
Lotus 123 rel. 2.01	**1099.00**	**650.00**
Microsoft Word V.3.0.	999.00	745.00
Microsoft Word V.3.0. Mouse	1299.00	945.00
Mirror	**145.00**	**109.00**
MultiMate 3.3	1199.00	745.00
Notebook II	**370.00**	**339.00**
Norton Utilities 3.1	**175.00**	**149.00**
Open Access V.2.0.	1299.00	899.00
Paradox	**1470.00**	**959.00**
PC Alien	105.00	99.00
Reflex 1.1	**298.00**	**229.00**
Super Calc 4	**895.00**	**599.00**
Symphony 1.2	**1470.00**	**959.00**
Side Kick ver. 1.5	109.00	85.00
TK! Solver 1.6	599.00	499.00
Timeline ver. 2.0	**890.00**	**670.00**

Availability may be limited at prices advertised.

SUPER SPECIALS FOR THIS MONTH ONLY

Miniscribe 72 MB	$2990.00
Le Modem	$360.00
Seagate 30 MB	$1090.00
Hypertec 512 KB M/Function Card	$409.00

MODEMS

NetComm 3 + 12 modem	$229.00
NetComm Smart 123A	**$1050.00**
NetComm Smart 1234	**$1290.00**
NetComm Smart 2123	**$539.00**
NetComm In/Modem	**$360.00**
NetComm In/Modem 1234	$1190.00
NetComm In/Modem 123	$790.00
NetComm Smart 2400	$899.00
NetComm Smart 1200	$629.00
NetComm Trailblazer	$Call

IBM HARDWARE

SAM Computer Phone Answering	$660.00
VoiceCommand	$1290.00
Cipher 25MB tape	$1890.00
Intel Above Board	**$599.00**
Hercules Ram Font	**$499.00**
Qubie 20MB hard disk	$1050.00
Qubie 44MB hard disk	$2600.00
Qubie 6 Pak 384KB	$429.00
8087	$279.00
Taxan Super Vision IV	$1290.00
Sigma Color 400	$990.00
Taxan Super Vision III	$839.00
Qubie color monitor	$699.00
Irwin 10MB tape internal	$1150.00
AST 6 Pak with Sidekick	$379.00
Microsoft Mouse	**$295.00**
Tandon 20MB hard disk	**$1049.00**
Toshiba P351 Printer	**$Call**
NEC P5 Pinwriter	$1800.00
NEC P6	$880.00
NEC P7	$1190.00
NEC ELF Spinwriter	$799.00
Brother M1509	**$829.00**
Epson LQ1000	$1490.00
NEC Multisync	**$1599.00**
Brother M 1709 24 pins	**$999.00**
Plus HardCard 20	**$Call**
Epson RX 100+ incl. csf	**$995.00**
Miniscribe 30MB	**$1150.00**

Prices apply to stocks held as at 12/12/86.

DISCWARE

Call for specials and sales-tax exempted prices: (02) 212-6933. Call in, order by phone, or send cheque or money order to: DISCWARE, 5th floor, 3 Smail Street, BROADWAY, NSW 2007 TLX: AA23509. For all products not listed call (02) 212-6933. Viatel * 778 000#

APC-1-87

SOFTERM PC™

MICRO-TO-MAINFRAME CONCURRENT COMMUNICATIONS EXACT TERMINAL EMULATIONS

Softerm PC Revision 2.00 New Features

- New file transfer protocols
  Kermit
  Kermit-Server
  Super-Kermit (Sliding Windows)
  Crosstalk (Clink)
  Hayes-Verify
  Xmodem-CRC
- Keyboard Macro learn mode
- Host virtual disk support
- Terminal emulation
  Keyboard translate
- New monitor mode commands
- String variables
  Find String
  Extract String
  Binary to ASCII
  ASCII to Binary
- Editor transparent mode
- New communications and print queue utilities

FEATURES

- Use as a standalone program or integrate as an extension to PC-DOS
- Concurrent, multi-port operation
- Complete emulation of over 30 terminals
- Hot Key toggle to and from PC-DOS
- Built-in full screen text editor
- Monitor mode for remote access
- Terminal emulations support conversational and block modes, and complete emulation of all display any keyboard functions
- Use to access information services, bulletin boards, electronic mail systems, or your company's computer
- Operates at speeds up to 9600 baud, full or half duplex
- Menu-driven setup featuring formatted data entry and editing
- Online capture to print or disk
- Copy screens to print or disk
- Keyboard macros
- Built-in phone book for automatic dialling
- Supports popular auto-dial modems and modem cards
- Terminal status display
- Extensive file transfer capability includes automatic execution from command files
- Character protocol for text files with user-defined parameters
- XMODEM protocol
- Softrans™ protocol provides CRC-16 error checking and includes an adaptable source program for your host computer
- Built-in disk and file utilities to display, print, or copy any file
- Automatic startup and execution from batch files
- Advanced features allow background operation while using other programs
- Comprehensive user's guide
- Built-in patch utility

TERMINAL EMULATIONS

TTY Compatible
ADDS Regent 20, 25, 40, 60
ADDS Viewpoint, Viewpoint/78
Data General D200, D410
Datapoint 3601, 8220*
Digital Equipment VT52, VT102, VT220
Hazeltine 1400, 1410, 1500, 1520
Hewlett-Packard 2622A, 2624B*
Honeywell VIP 7205, 7801, 7803, 7813*
IBM 3101 Model 10 and 20, 3161*
Lear Siegler ADM-2, ADM-3A, ADM-5
TeleVideo 910, 921, 925, 950
Texas Instruments Model 931
TRS-80 Model 16 Console
Wyse 50*
User Defined

*Coming Soon

Softerm is also available in versions for the NEC APC III, Tandy 1000/1200, Wang PC, TI Professional, DG1, Gridcase and Apple IIe & IIc

SOFTERM PC IS A COMMUNICATIONS BARGAIN

$499

WORDCOMM

Suite 203, 156 Pacific Highway, St. Leonards N.S.W. Australia 2065
Telephone: (02) 439 7144, (02) 439 6312 Telex: AA10713845

SCREENTEST

PC File

ShareWare is a form of software that has had an enthusiastic reception in the US, but has been greeted with some hesitation in Australia. Kathy Lang looks at the ShareWare collection's database, PC File

Among the more intriguing novelties produced by the advent of micros in the US has been the concept of ShareWare (see 'Communications', December *APC*). A ShareWare program can usually be given away by any user to another, though not sold or bartered; the program disk generally includes a copy of some rudimentary documentation, which can be printed on pretty well any printer. If the recipient likes the program and wants to go on using it, he or she sends a modest fee to the writer of the software, and receives in return a copy of the most up-to-date version of the program, a manual and a guarantee of notification of new versions of the product as they are produced, obtainable at an equally modest fee. Registered users' queries are usually answered by post, and there may also be some limited hot-line support. The idea has become very popular in the US, since it enables small programming outfits to distribute their products very widely without a vast advertising budget, while giving users viable software at a very cheap price — usually $US50 or so for a word processor, file manager or communications program.

In Australia, the idea has been slower to catch on; principally, I think, because people are reluctant to believe that anything worth having can be so cheap, and perhaps also because of a reluctance to transmit money to unknown suppliers overseas. However, low-price software has become much more 'respectable' with the launch of the Amstrad PC, and the consequent dramatic drop in prices of many established products, at least in cut-down versions. At the same time, many people have become aware that they cannot expect much support at such prices — but for a fair few that will simply be a formalisation of an existing situation, since few dealers actually provide the level of software support that users expect. We thought that these factors made this an opportune time to have a closer look at the major ShareWare contender in the data management stakes, PC File.

Benchmarks

BM1	Add one new record	Inst
BM2	Select record by primary key	Inst
BM3	Select record by secondary key	NP
BM4	Access 20 records sequentially on three-character field (BM2 key field)	Inst
BM5	Access record using wild code	Inst
BM6	Index file on three-character field	NP
BM7	Sort file on five-character field	3mins 59secs
BM8	Calculate on one field per record and store result in record	34mins 10secs
BM9	Total three fields over all records	5mins 2secs
BM10	Add one new field to each record	NT
BM11	Import 1000 records	7mins 20secs

NT=Not Tested; NP=Not Possible; +=inc scrolling

Where two times are given, first is access to first record, second is access to each subsequent record

PC File is in some respects a relief after the sheer weight of some of the major commercial packages. It is supplied on a single floppy disk, and it would not be out of the question to use it on a single floppy drive machine such as the basic Amstrad PC. Although called PC File, this should not be interpreted as implying 'IBM PC' — it is said to run under MS-DOS on any system which supports an ANSI terminal device. (All that means is that you must have, in the root directory of your system disk, a file called 'ANSI.SYS' — it should be distributed with your official DOS disk — and also an entry in your CONFIG.SYS file reading 'DEVICE=ANSI.SYS'). With the demonstration copy comes a disk file containing enough documentation to get started; to encourage you to register with Buttonware, the supplier, the document is lavishly interspersed with boxes saying 'Section omitted. Evaluation copy'. But what remains is quite enough to get going and see whether PC File is sufficient for your needs. The package is menu-driven, with a choice between using function keys or entering the first three characters of an option to select it: the main menu is shown in Fig. 1.

Constraints

The most serious constraint is likely to be the limit to 65 characters per field for records with up to 21 fields, and to 25 characters over that limit; the absence of date fields will also cause problems for many. There is some limited data validation: apart from testing to see that the data is of the correct type, you can also set up an input mask that specifies the characters valid for a particular field.

Features

Max file size	9999 records
Max record size (chars)	1430
Max no fields	42
Max field size (chars)	65/25
Max digits	Not stated
Max prime key length	65
Special disk format?	No
File size fixed?	No
Link to ASCII files?	Various formats
Data types	Numeric, Character
Fixed rec structure?	Yes
Fixed record length stored?	Yes
Amend rec structure?	No
Link data files?	No
No. data files open	1
No. sort fields	10
No. keys	1
Max key length (chars, fields)	65, 1
Subsidiary indexes kept up-to-date	NA
Data validation	Adequate
Screen formatting	Default given
Unique keys	No
Report formatting	Default given, col/row coords
Store calculated data	Batch update
Totals & statistics	Totals
Store selecn criteria	Permitted
Combining criteria	And, Or
>1 criterion/field?	Yes
Wild code selection?	Any part string
Browsing methods	Any field
Interaction methods	Menus
Reference Manual	Not tested
Tutorial guide (max 5*)	**
Reference card	None
Online help	None
Hot-line?	None

Note: NA=Not Applicable;

File creation & indexing

Only one step is required to set up a file: you enter field names and lengths in a simple grid. A numeric field is distinguished by attaching a hash sign to its name; otherwise, all fields are character. The first field in the file becomes the index, and no secondary indexes are allowed. (This is now, however, a serious drawback unless you need to create complex multi-file indexes — retrieval on any single field is very fast, as the Benchmarks show).

Data entry & updating

Data can be added, amended or deleted onscreen, and amended or deleted automatically in batches. PC File displays your record as a simple grid of field names and values, allowing you to use normal cursor movements while editing. Records can be selected for updating using any field, and making complete or partial matches (for more on this, see 'Selection & sorting'). When a particular record has been found, you can browse forwards or backwards in the file, in its current order; this will normally be roughly in entry order, but you can sort records into almost any order if you need to — the order is not maintained when sorted fields are edited, though.

Batch updating is very basic. You can delete a set of records by specifying criteria which they must match; you can also update a set of records automatically, but the only change possible is the replacement of a field value by a constant, which would be very limiting in some applications.

Screen display

During data entry and record display, each record occupies a single screen, with each field on one line (see Fig. 2).

Any report can be sent to the screen as an alternative to the printer, but this does, of course, make it impossible to design data entry screens for particular applications.

Printed reports

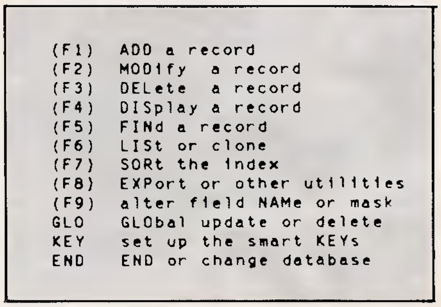
PC File provides a basic report format that is essentially a list. Without modification, the simple columnar format would take care of quite a lot of requirements, but there are also some additions to the basic format, such as the inclusion of sub-totals on a pre-sorted field. You can adapt the report layout in order to export data in a number of formats, in addition to those provided by the Export module. A label-printing facility allows you to print labels several-up across the page. Report formats may, if you wish, be saved for subsequent re-use; they are stored in a simple text form that can be amended using an editor or word processor.

Selection & sorting

When amending a file, or displaying one record at a time, you can find records quickly by entering the value of the key — that is, the first field in the record. (You can also ask to see the next or previous record, the last in the file, or any record by its relative number if you know it.) As an alternative, you can find records by searching on any field; you can request a match on any characters in the field, on the first few characters, or using a 'Soundex' search. For example, if you asked for a match on the word Smith, the first method would find Wordsmith, Smithson and Smith, the second would find Smith and Smithson, while the third would find Smith and Smyth. A good Soundex mechanism can be very useful in applications where small misspellings are common, for example when entering names and addresses. Whichever selection method you choose, you can stay displaying one record per screen, or go into 'browse' mode in which the next or previous 20 records are shown.

While such searches do not use conventional keys they can be very quick, especially for searches of the 'starting characters' type, on files of a thousand records or so.

If you use PC File's reporting capability to list records (for display only), you can use a much wider range of selection facilities, allowing you to use the conventional relational operators, and to specify



```
(F1)   ADD a record
(F2)   MODify  a record
(F3)   DELete  a record
(F4)   DISplay a record
(F5)   FINd a record
(F6)   LISt or clone
(F7)   SORt the index
(F8)   EXPort or other utilities
(F9)   alter field NAMe or mask
GLO    GLObal update or delete
KEY    set up the smart KEYs
END    END or change database
```

Fig. 1: The main menu: FINd a record is the default option.

The Cheapest

We offer you the opportunity to test our claims. The Computer House will better any price on any computer item from any other dealer. Try us, you won't be disappointed.
Ring now on (03) 699 2000.

OUR GUARANTEE

We guarantee to find you the lowest prices in Australia. The lowest prices on a complete range of products backed by Australia-wide maintenance and service. Guaranteed Service. Guaranteed Savings. Guaranteed Satisfaction.

SOFTWARE

	Excl. tax	Incl. tax
Spreadsheets		
Supercalc 4	$469	$563
Lotus 123 Rel. 2	$570	$652
HAL	Call	Call
Silk	Call	Call
V.P. Planner	$158	$178
MS Multiplan	$295	$335
Database		
Q & A	$448	$498
dBase III plus	$799	$936
Paradox	$790	$887
R Base Systems	Call	Call
Reflex	$195	$225
Clipper compiler	$759	$899
Dataflex	$1095	$1285
Word Processing		
Leading Edge	$249	$295
Multi Mate products	Call	Call
Wordstar	$319	$374
Wordperfect	$499	$589
Microsoft Word	$634	$725
Integrated		
Framework II	$890	$1050
The Smart Series	$939	$1148
Symphony	$895	$959
Enable	$846	$976
First Choice	$225	$257
Open Access	Call	Call
Utilities		
Sidekick (Unprotected)	$92	$108
Norton Utilities	$127	$139
Mace + Utilities	$119	$145
X-Tree	$89	$98
Fastback	$154	$169
Sideways	$78	$ 99
Copywrite	$77	$ 98
Microsoft Windows	$165	$188
PC Alien	$82	$ 96
Languages		
Microsoft C compiler	$720	$786
Microsoft Macro Assemb.	$313	$348
Microsoft Quick Basic	$163	$169
Turbo Power Tools	$190	$214
Turbo Pascal	$99	$128
Turbo Prolog	$123	$154
Accounting		
Satchel	$620	$695
Dollars and Sense	$229	$259
Sybiz Book Worker	$799	$892
Accounting 1	$775	$845
T*A*O* Specialised accounting for accountants		Call
also Sybiz, I.A.L., Integrity, etc.		Call
Communications		
Crosstalk	$174	$197
Reflection H.P. Emulation	Call	
Smarterm	Call	
Carbon Copy	Call	
Entertainment		
Jet	Call	$105
Zork I, II or III	Call	$ 84
H/Hikers Guide to Galaxy	Call	$ 77
Karateka	Call	$ 84
and many more	Call	Call
Project Management		
Harvard Project Management	$595	$694
Super Project plus	$495	$548
Microsoft Project	$546	$657
Timeline	$597	$698

HARDWARE

	Excl. tax	Incl. tax
System Units		
Trigem (inc. 80386)	Call	Call
Skai range	Call	Call
Leading Edge from	$2259	$2589
Profound	$1349	$1495
Epson	Call	Call
Chendai (inc. laps)	Call	Call
Disk Drives		
Miniscribe 20Mb	$995	$1120
Seagate 30Mb (inc. Controller)	$899	$1036
Tandon 20Mb	Call	$1039
bigger than 20Mb	Call	Call
Hardcards		
Hardcard by Plus 20Mb	$1399	$1645
Mountain Drivecard 20Mb	Call	Call
Tape Backup		
Internal & External	Call	Call
M'Function & Memory Boards		
Hypertec Hyper-512 MF	$349	$398
Hypertec Hyper- 512	$245	$269
Hypertec Hyper - 256	$178	$185
M'Function XT	$219	$242
Intel Above Boards	Call	Call
AST Ram page PC	Call	Call
Display Cards		
Hypertec Hypervid E.G.A.	$863	$899
Paradise Autoswitch E.G.A.	$547	$639
Hercules Graphics Card plus	$408	$475
Hercules Graphics Cards	Call	Call
Vega Card	$547	$655
Many others from	$158	$175
Express Cards		
Hyper Ace 286 (6Mhz)	$649	$699
Hyper Ace 286 Plus (10 Mhz)	$786	$894
and many others	Call	
Monitors		
E.G.A. from	$820	$995
Mono Green or Amber from	$170	$199
Colour from	$495	$545
NEC Multisync E.G.A.& PGA	Call	Call
Modems		
Netcomm 2123	$427	$518
Netcomm 123A	$946	$1049
Le Modem	$348	$395
Complete Netcomm Range	Call	
Complete Data Bridge Range	Call	
Supplies		
Complete range including diskettes, tapes, printer ribbons, paper etc.	Call	Call
Printers		
Epson FX 105	$789	$946
Epson LQ 1000	$1140	$1299
Epson FX-1000	Call	Call
Epson LX 86	$413	$464
Fujitsu DL 2400	$1654	$1895
Seikosha	$2439	$2790
Brother	Call	Call
Laserjets	Call	Call
Other Boards and Peripherals		
Microsoft Mouse (Bus or Serial)	$283	$323
Power Supplies	$179	$199
Plotters (H.P. or Roland)	Call	Call
Cables	Call	Call
Acoustic Hoods	Call	Call
Printer Buffers	Call	Call
Power filters	Call	Call

REMEMBER THIS IS ONLY A SAMPLE OF OUR PRODUCT RANGE - CALL NOW FOR THE PRODUCTS OF YOUR CHOICE.

PLUS

• Free Hotline Service • Immediate* replacement of any defective stock • Training arranged • Expert advice • Australia wide maintenance

DELIVERY

• Anywhere in Australia for $7.50 (under 3Kg.)
• Overnight on request • Goods over 3Kg are charged at Post Office rates
• Prices are subject to change without notice
• Terms: Payment on receipt of goods • Bankcard, Mastercard, Visa accepted

"We rent PC's, call now for information"

TCH 148

The Computer House

Phone Now (03) 699 2000

27-33 Raglan Street, South Melbourne Vic. 3205. Telex: 34145.

*Subject to availability

THE LATEST

REAL DESKTOP PUBLISHING FOR THE PC HAS ARRIVED

XEROX VENTURA PUBLISHER $1495

You no longer have to cut and paste or send your catalogues and manuals to outside production houses. Ventura Publisher lets you produce documents *much faster* and *more easily* than conventional, labour intensive methods, with quality that rivals outside print shops.

Ventura's WYSIWYG display lets you integrate text, graphics and images at will. Create new frames and move them around with your mouse. The page is instantly reformatted on screen with text automatically flowing around the graphics. The software quickly integrates text and graphics from all the standard wordprocessing, spreadsheet and graphics programs (including AUTOCAD).

If you don't have typographic and layout skills yet, a wide selection of predesigned layouts help you automatically format typical business and technical documents. As you become a more skilled user, you can create layouts of your own with the system's extensive format specification facilities. The system also includes a very powerful text editing function of its own.

Finished documents can be printed on standard dot-matrix, laser or colour ink-jet printers, or they can be output to phototypesetters.

While AT-class computers will give super performance, Ventura Publisher will run quite acceptably on a standard PC provided it has at least 512K memory, Winchester disk and graphics card. A mouse is also required. Printers and image scanners are optional, depending on your needs.

DEDICATED WORDPROCESSING FOR YOUR PC

WPS-PC $695

If it's fast, easy to use wordprocessing you need, WPS-PC is the answer. WPS-PC is nothing like the 'popular' packages you see advertised. If they are 'user friendly', WPS-PC requires no learning at all! The keyboard is completely redefined and labelled for dedicated WP functions – one keystroke to bold, another to underline, and so on, WPS-PC is just like the dedicated DIGITAL DECmate wordprocessor (right down to the GOLD KEY) but runs much faster.

Includes full List Processing, Spelling checker and Communications. The best professional WP available for the PC!

RUN ALL APPLE SOFTWARE ON YOUR PC!

TRACKSTAR 128 $795

The software available for your IBM-PC has just *doubled.* With Trackstar 128 you can run virtually all Apple (II, II+, IIc, IIe) software with ease. Just install the card, boot from our floppy and run the Apple program of your choice.

With Trackstar 128 your PC acts like an Apple with RAM card, 80 column card and colour graphics (RGB) card installed. It runs Apple ProDOS, DOS 3.2, DOS 3.3 and Apple PASCAL, and supports 80 column mode, plus RGB, composite colour and IBM mono output for all Apple text and video modes. 128KB and 64KB programs are supported, as well as parallel and serial printing. An Apple games port and Apple compatible disk drive interface (for any difficult copy-protected software) are included. Also transfer files between MS-DOS and Apple. Tested as 99.99% compatible on over 350 of the most popular Apple programs. IBM programs for you and Apple for the family.

TOP CLASS CAD AT A BUDGET PRICE

DRAFIX 1 $595

So you would like the power of professional computer aided drafting software such as AUTOCAD but can't afford it? DRAFIX 1 provides an elegant solution. DRAFIX 1 has an excellent user interface with multi-layer menu structure to get you mobile quickly.

High quality documentation and ease of use give you a painless start to 2D CAD. When you *really need* the full power of AUTOCAD, we will be pleased to upgrade you – with a trade-in of 50% of what you paid for DRAFIX 1.

CIVIL ENGINEERING SYSTEMS

LOGO TECHPAK

Provides engineers and surveyors with modules for Road Design, Drainage Design, Contours and Volume Determination, Terrain Modelling and Subdivision Design. Interfaces to AUTOCAD. This is the leading software on the market. We can supply complete systems with computer, plotter and training.

HOW LOW CAN YOU GO?

PC CABLES GALORE

Simply the best value in PC cables you can get anywhere. LOGO cables come as IBM/Centronics, Centronics/Centronics and RS232 (all pins straight through).
2 metres $15, 3 metres $18.

RELEASES!

AUTOMATIC PRINTER SWITCHING

PRINT MANAGERS
From $550

Need a buffer that will automatically enable four computers to share up to 2 printers? Or a buffer which will enable you to use 2 printers at the same time? Or a buffer with 2 serial *and* 2 parallel interfaces installed so you can easily switch between parallel and serial devices? Our range of Print Managers provides the answers. Parallel and serial versions. Low cost manual switches also available.

NEW IBM SOFTWARE
THE VERY LATEST FROM THE USA

AskSam – voted Editor's Choice in PC magazine (Nov. 1986), this is the latest text-based database management system. Supports structured and free-format files or any combination to 4000MB.	$395
Key Mailer – for those who need a really professional mailing list manager. Print labels and reports. Interface to wordprocessors for form letters. Powerful search and query capabilities.	$395
Q-DOS – the best and fastest hard disk manager you can get.	$95
Media Master Plus – the standard if you want to transfer files between computers (includes CP/M emulator).	$145
Xenocopy PC – supports about 300 formats for file exchange (all disk sizes).	$195
Backup Master – the newest and best hard disk backup utility you can buy. Very flexible and easy to use with full menu structure, 'inclusive' and 'exclusive' copying.	$155
Accelerate 8/16 – high performance CP/M emulation for MS-DOS. Includes Media Master PLUS and V20 chip.	$195
Twist and Shout – sideways and banner printing utility for dot-matrix printers (CP/M and MS-DOS).	$95

LASER PRINTERS

IMPACT, DATAPRODUCTS, QUME, HP AND XEROX

From the humble HP LaserJet at 8ppm to the Dataproducts range at 26ppm, we can supply the laser printer to suit your needs and your budget.

Whether it is for wordprocessing or sophisticated desktop publishing, we will provide you with a complete system for your requirements.

NEW DEC PRODUCTS
FOR RAINBOWS AND DECMATES

WPS-DOS – just like WPS-8 on the DECmate but much faster. Includes list processing, Spelling Checker and Communications. Excellent wordprocessing for the Rainbow.	$695
Media-Master – disk to disk transfer of files with other computers.	$225
Code Blue – now you can run most IBM non-graphics software on your Rainbow.	$225
Print Screen – utilises the Print Screen key to instantly dump screen text to your printer (CP/M or MS-DOS).	$95
Twist and Shout – sideways and banner printing utility for dot matrix printers (CP/M and MS-DOS).	$95
Switchmate – Run 3 DECmates to 1 printer or 2 DECmates to 2 printers (fully automatic).	**from $1495**

POWER COMPUTERS

NCR PC8, NEC APCIV, VT/AT, KAYPRO, SHARP

As well as the standard and turbo PCs, LOGO supplies the highest performance computers now available. If speed and productivity is what you need, come in and see the leading power computers.

For exceptional power and value in its class, see the Australian assembled VT/AT. Over 11.5 times faster than an IBM PC/XT it is ideal for desktop publishing, engineering or any applications requiring high performance.

SPECIAL

COMPUTER SYSTEMS

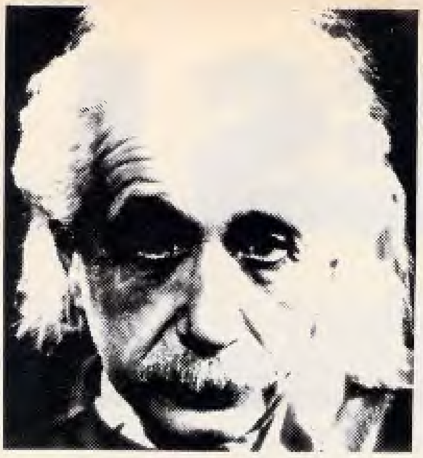
FREE WHILE STOCKS LAST – Able 1 integrated spreadsheet database, graphics, wordprocessor with each system purchased (but only if you mention this ad!!).

LOGO

LOGO Computer Centre
Suite 303, Henry Lawson Business Centre,
Birkenhead Point
PO Box 389 Drummoyne. Phone (02) 819 6811

WHEN YOU WANT THE BEST!

All prices plus sales tax where applicable



We only use 10% of our mental potentials

These are the words of Albert Einstein, the greatest physicist of recent times.
L. Ron Hubbard's discoveries in the field of the mind prove today that Einstein was right.
In his book *DIANETICS: The Modern Science of Mental Health*, L. Ron Hubbard takes one more gigantic step in this direction. He demonstrates how anyone can use his discoveries and rid himself of the barriers that have so far prevented him from using his mental potentials fully.
More and more people including artists, M.D.s, managers and workers use DIANETICS.
And the thousands of written reports on their successes are the best proof for the quality of this book.
Order your own copy today! Mail the order form below to:

DIANETICS INFORMATION CENTRE

201 Castlereagh St
SYDNEY, N.S.W. 2000

41 King Street,
PERTH, W.A. 6000

106 Edward Street
BRISBANE, QLD. 4000

28 Waymouth Street
ADELAIDE, S.A. 5000

23 East Row,
2nd & 3rd Rooms
CANBERRA, ACT 2601

42-44 Russell Street
MELBOURNE
VIC.3000

YES! Please send me my copy of *DIANETICS:* The Modern Science of Mental Health by L. Ron Hubbard.
☐ Hardback $27.00
☐ Paperback $7.00
☐ Please debit my Bankcard
☐ Cheque enclosed
Account No. 496
☐☐ ☐☐☐ ☐☐☐☐☐☐
Valid from .... to ....
Signature ....
Name ....
Address ....
....

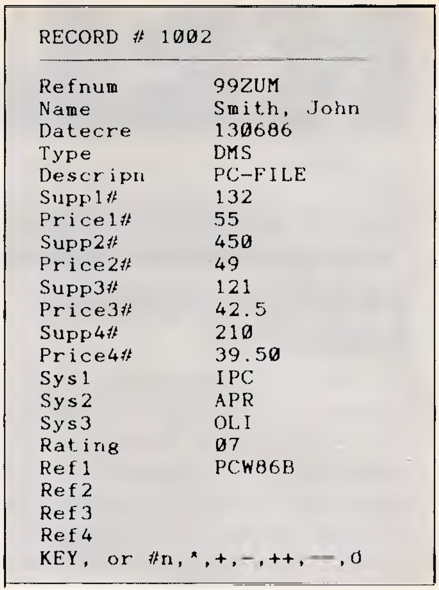
© 1986 by N.E. Publications. All rights reserved. Dianetics and Hubbard are trademarks and service marks owned by Religious Technology Centre and used with its permission.

that all or just some test must be passed for the record to be selected.

In either case, the file will normally appear in the order in which the records were entered (or roughly so, since the space used by deleted records is re-used as appropriate). Records can also be sorted on up to 10 fields at a time; the authors have put some thought into making this a relatively rapid process, especially for files of a thousand or more records. Sort order is not necessarily maintained over editing sessions, though: to be sure the field is in the right order, you must sort it again before producing further reports.

Calculations

PC File does not provide the ability to make calculations as data is entered, but you can have calculated fields in reports, and hence create calculated fields in



```
RECORD # 1002

Refnum        99ZUM
Name          Smith, John
Datecre       130686
Type          DMS
Descripn      PC-FILE
Supp1#        132
Price1#       55
Supp2#        450
Price2#       49
Supp3#        121
Price3#       42.5
Supp4#        210
Price4#       39.50
Sys1          IPC
Sys2          APR
Sys3          OLI
Rating        07
Ref1          PCW86B
Ref2
Ref3
Ref4
KEY, or #n,*,+,-,++,--,0
```

Fig. 2: PC File data displayed in a one record-per-screen format.

Summary

Information handling	PC File is a 'flat file' package — that is, each record in a file must have the same structure and you cannot link records in different files. It would be suitable only for simple types of data structure, such as names and addresses, not for more complex types such as stock records linked to supplier and customer records. And each record takes the same amount of space however much or little it contains, so PC File is not suitable for records of widely varying depth, such as library catalogues containing abstracts.
Processing	PC File provides total and calculated fields in reports, but no other calculations. Selection facilities are flexible and easy to use, including 'Soundex' for 'sounds-like' matching, making it ideal for applications such as mailing lists. Simple processing is very fast, though the more complex tasks are relatively slow.
Housekeeping	PC File's features should be good enough for most requirements. Records can be amended onscreen, being selected by key or on another field, or by browsing in entry order; very simple changes can also be made in batches, for example to change the current vaccination status of a selected group of patients.
Control	Menus are used for overall control, with special keys in context — for example, '+' to move forward one record when browsing. Though you can store frequently-used key sequences, you can't store commands to tailor the use of PC File for novices; but it's so simple to use that such sophistication is unnecessary.
Support	When you are a registered user, Bottonware will answer queries by letter and, if urgent, by telephone. But there is no organised support in Australia. Again, for such a simple package, you should not need it.
Price	$US49 (payable in dollar cheques, or by Visa Card). Visa card).
Supplier	Jim Button, Buttonware, PO Box 5786, Bellevue, WA 98006, USA.
Systems	Disk is supplied in IBM PC format, but PC File will run on any MS-DOS system that can support an ANSI terminal driver.

IBM • APPLE • ZENITH • OLIVETTI • C-ITOH • RITEMAN • SOFTWARE SOURCE • BROTHER • NEC • OLYMPIA • STAR • ANITECH •

LOTUS • MICRO GENERAL • QUBIE • CANON • TALLGRASS • ADLER • ORCHARD • HERCULES • AST • BORLAND • CITIZEN • PRINCETON • THOMPSON • QUADRAM • CIRTECH •

AUTOICE • INTEL • MICROSOFT • KAGA TAXAN • IMAGINEERING • ARCOM PACIFIC • ASTON TATE • EPSON • TANDON • CORVUS •

HEWLETT PACKARD • SOFTWARE SOURCE • BROTHER • NEC • OLYMPIA • STAR • ANITECH • LOTUS • MICRO GENERAL • QUBIE • CANON • TALLGRASS • ADLER • ORCHARD •

THANK YOU!

NICE MODEM II

- HAYES COMPATIBILTY
- 300, 1200, 1200/75 FULL DUPLEX
- AUTO DIAL AND ANSWER
- PASSWORD SECURITY FEATURES
- AUSTRALIAN MADE, 12 MONTH WARRANTY
- COMMUNICATIONS AND TERMINAL EMULATION SOFTWARE SUPPLIED

$699 OR **$749** WITH VIATEL

DTX-2001

- IBM COMPATIBLE 14" COLOUR MONITOR
- GREEN AND AMBER SWITCH
- MANUFACTURED IN SINGAPORE
- LOCALLY SUPPORTED BY DTX AUSTRALIA

$550

TANDON 20 MEGABYTE HARD DRIVE

- FULLY JAPANESE
- 1 MEGABYTE PUBLIC DOMAIN SOFTWARE SUPPLIED FREE
- 1 YEAR WARRANTY
- INSTALLATION SYDNEY METROPOLITAN $60

$995

EGA CARD AND EGA MONITOR

- INCLUDES 256K OF MEMORY
- MONITOR WITH GREEN, AMBER, RED SWITCHING

$1455

BROTHER 2024L

- 24 PIN LETTER QUALITY PRINT HEAD
- 160 CPS DRAFT
- 80 CPS LETTER QUALITY (BROUGHAM 10)
- 96 CPS LETTER QUALITY (BROUGHAM 12)
- 15" CARRIAGE

$1495

XT-286

ACCELERATOR BOARD

- UP TO 7.5 TIMES FASTER
- SWITCHABLE BETWEEN 8088 AND 80286
- ROOM FOR MATHS COPROCESSOR
- 8K CACHE MEMORY BUFFERING

$725

(02) 349 2366

tenco

COMPUTER HAVEN

CONSULTANTS TO THE MICROCOMPUTER INDUSTRY

183 Maroubra Road, Maroubra Junction, N.S.W. 2035

THE AUTHORIZED DISTRIBUTOR

other PC File files or in exported files, using basic arithmetic.

Tailoring

There are no 'programming' facilities as such within PC File, but you do have the ability to store frequently used keystroke sequences on 'macro' keys — up to 10 of these may be in use at any one time. These keys are set up simply by entering the keystroke sequence — there doesn't seem to be any editing capability. More basic tailoring, such as specifying the printer, the colours of the screen and the name of a data file to be used when the program is started up, is achieved by modifying a parameter file, stored on disk in text format, which can be amended by an editor or word processor.

Links with outside

PC File can import and export files in several common formats, including the 'mail-merge' format used with WordStar for writing personalised letters, and the DIF format which gives access to many spreadsheet programs. In many packages this is a rather slow process; PC File is not exceptionally fast, but it's faster than many others in this area.

User image

The major facilities of PC File can be invoked through the main menu, or, in most cases, reached directly from DOS by running the appropriate module. Once into a module, the current options are displayed on the 25th line. Occasionally I became confused as to exactly where I was in the package, but by and large I found PC File as easy to use as one would hope would be the case with this kind of product.

In general, my main use of the manual was to find out what the package was capable of, rather than using it to learn how to do things. The typed documentation which comes with the evaluation version is quite straightforward and easy to understand. The pukka manual had not arrived by the time *APC* went to press, so I'll add a note on this to a later article.

Conclusion

PC File is definitely in the cheap and cheerful' category. The 'flat file' approach, the limitations on field size, and on numbers of fields and records, and the restricted calculation features, would rule it out for more sophisticated applications. But for many basic applications, especially in such areas as mailing lists, membership records and the like, PC File is well worth considering.

Against the extreme cheapness of the package, and the positive features, such as the selection facilities and the speed of straightforward retrieval, must be balanced the lack of support in Australia; but for such a simple database you may never feel the need for it.

END

Your TAIWAN Connection

TOTAL PERIPHERALS PTY LTD, a Taiwan-based company dealing in computer hardware and peripherals, is now in Australia. Giving you a reliable and direct access to Taiwan. You get better and affordable deals always.

Not forgetting also, a total back-up service at your command.

IBM® PC-XT COMPATIBLE

IBM® PC-AT COMPATIBLE
with licensed PHEONIX BIOS

PERIPHERALS

Call 5595311 today!
(Wholesale only)

Dealers and OEMs enquiries welcomed

IBM® is a registered trade mark of International Business Machines Corporation.

TOTAL PERIPHERALS PTY LTD 25, Floss St, Hurlstonepark, Sydney NSW 2193, Australia

(Advertisement)

USER SUPPORTED SOFTWARE PC-SIG

Inexpensive Software

The marginal cost of producing a software product is simply the cost of a diskette, a manual and distribution. Software need not cost hundreds of dollars.

The alternative to expensive software is now available in Australia — User Supported software.

User Supported software is an approach to software publishing that bypasses the high costs of corporate overheads, advertising and the middleman. If a user is pleased with and uses the program the author requests a nominal fee, usually $10 to $100. Manuals are supplied on the diskette and are printed by the user.

PC-SIG is the world's largest distributor of User Supported software with a library containing over 600 disks. Anybody can purchase diskettes for just $13 each or join as a member. A membership includes a listing of the library on diskettes or in book form, regular newsletters, and discounts on bulk purchases. The following is a small selection from the library . . .

Disk No 5 PC-FILE III V4.0

One of the widest employed user-supported programs, PC-File III is a general purpose menu-driven database manager. Designed for business, professional and home users, it allows you to retrieve data, change it, resequence it and perform queries quickly. It also prepares reports for display, printing or subsequent retrieval by your word processor, all through menus. Reports can be generated in many different layouts.

Disk No 10 CHASM V2.13

This full-featured assembler is ideal for learning assembly language and powerful enough for production coding.

Disk No 78 PC-WRITE V2.6/5

This powerful word processor supports most printers and incorporates 46 printer control files. Notable features include nine help screens, fast edit and save functions, split-screen editing and user configuration of keyboard, display and printer.

Disk No 184 DISKETTE UTILITIES V1.1

The utilities on this disk are grouped into three distinct categories. In the first category, COVER makes a disk-sized directory for easy storage. The second category contains a variety of utilities dealing with functions as diverse as altering file attributes and the creation of RAM disks. The third category has a wide range of unprotected utilities to help make backup copies or transfer copy-protected programs to a hard disk.

Disk No 199 PC-CALC V3.0

This spreadsheet program comes with a tutorial and many advanced features. Math functions include natural logs, power of x, averages and tangents. There are 26 columns by 255 lines with 64 characters per cell. It supplies numeric precision to 14 decimals and flexible print options with onscreen prompts.

Disk No 254 PC-DOS HELP V1.1

These programs offer on-line help capability for DOS commands. Type HELP for a master list of DOS functions. This disk is especially convenient for hard disks where it can be called on at any time.

Disk No 273 BEST UTILITIES V1.0

This is a compilation of the better utilities from the PC-SIG library. Most of the programs require DOS. 2.0 or above.

Disk No 274 BEST GAMES V1.0

This is a compilation of the better games from the PC-SIG library.

Disk No 293 ARCADE GAMES V1.0

An assortment of colourful arcade games that will catch and hold the attention of game fans for hours.

Disk No 310 QMODEM V2.0e

This telecommunications program supports, among others, Hayes and Racal Vadic modems. It runs up to 9600 baud and features windowing, screen colour definition XModem protocol, autodial/redial.

Disk No 344 & 345 PC-KEY DRAW V1.0

This disk is composed of programs offering keyboard to screen drawing, graphics printing, and slide show capability. Built-in technical functions allow it to be used as a CAD system. It requires colour graphics.

Disk No 376 PATCHES V1.0

The programs on this disk allow the placement of specifically indicated programs on hard disks and the creation of backup copies.

Disk No 403 PC-TUTOR V4.2

This disk contains tutorials that cover the basics of a first course in computer usage and the IBM PC disk operating system. It also has a program that reads coded text files.

Disk No 405 PC-DESKMATES V1.1

The memory-resident accessory program can be called from any program or from DOS. It includes alarm clock, calculator, calendar, selected DOS commands, notepad, phone dialer, printer control and typewriter.

Disk No 480 PC-OUTLINE V1.04

PC-OUTLINE is comparable to ThinkTank. Users can outline and organise items by arranging and rearranging them using different classifications.

Disk No 523 SIDE WRITER

Side Writer allows printing of reports and other materials that do not fit in the number of columns across a page because it prints down the length of the sheet instead of across the width.

Disk No 599 to 603 DREAM

DREAM (Data Retrieval, Entry and Management) is a relational database program that comes in 5 diskettes. It has extreme power and flexibility. It can be used to custom design data base systems, reports, sorting agilities, query abilities and data entry and retrieval abilities. Complete with over half a diskette of manual and help facilities. It could be called an application's generator with over 32,000 records per data file and over 1,500 characters per fixed record length.

Yes please prove to me good software need not be expensive. I have circled the disks I would like

5 10 78 184 199 254 273 274 293 310
344 345 376 403 405 480 523 599 to 603

TOTAL ____________ @ $13 ____________

☐ Please enrol me as a member @ $28
includes my FREE directory
☐ on three diskettes
☐ in book form
(Postage and handling) ____________ $5.00

TOTAL ____________

PAYMENT BY ☐ Cheque ☐ Bankcard
☐ Visa ☐ M/charge

CARD NO. ____________

EXP DATE ____________ SIGNATURE ____________

NAME ____________

ADDRESS ____________

CITY ____________ STATE ____________ POSTCODE ____________

Manaccom Pty Ltd, official distributor in Australia for PC-SIG

WRITE TO: PO Box W42
West Pennant Hills
NSW 2120
OR CALL: (02) 875 3538

2509/FP/Little

MICRO-EDUCATIONAL PTY LTD

8/235 DARBY ST NEWCASTLE 2300 Ph (049) 26 4122

Australia's Largest Computer Mail-Order Company

BUY DIRECT... WITH CONFIDENCE

We offer:
* 8 years experience
* Overnight delivery
* 10 day money-back warranty
* 6 months full service warranty
* Top quality national brand products
* Competitive prices
* Excellent workshop service
* Friendly phone advice
* Phone, VIATEL and mail ordering
* AND we treat you like family!

TOP SELLERS

3.5" DISKS DSDD $5

5.25" DSDD $1.90 ($1.80 100's)

PERSPEX PRINTER STAND $35
JOYSTICK IIe/IIc $45
IBM JOYSTICK $50
SWS 60 DISK BOX $25
YA-40L 3.5" DISK BOX $25

DISKS $1.45

($1.35 IN 100'S)

US made - 75% clipping level. That's the best quality there is!!!

CAUTION: There are some very low quality Asian disks now flooding the market.

BUY THE BEST. Lifetime warranty, Micro-Ed logo, SSDD disks. These are premium quality, 75% clip, machine-made diskettes. Made in the US by Wabash DataTech. Suit Apple, Commodore, Microbee etc. Will also suit IBM as they can be used double-sided. You can spend up to $8 each for premium quality diskettes. Ours cost $1.45 because we sell A MILLION DISKS A YEAR! When you shift disks in truckload quantities you get real economies of scale. Check around. Even the chain stores are dearer than us on lifetime warranty diskettes.

We won't be beaten on price for quality disks!

GPA SUPERMODEM $395

Our top-selling modem. Features: Auto-answer, auto-dial, auto-disconnect, auto-line-turnaround, Hayes compatible, 300Bd Full-duplex, 1200/75 Viatel mode, 1200Bd full-duplex optional extra ($190 extra). Over 1300 sold! $395 (Cables $30 and IBM/Apple Viatel software $35 extra.) Also available as a Kit for $299!

FREE

With orders over $50:

*IBM or Apple Library Disk
*Macintosh or Amiga Library disk
(Add $5 for 3.5" disk.)

Full of the best of the available Public Domain software.

ORDER FORM

To: PO 160
THE JUNCTION 2291

Dear George,
Please rush me the following:______________

____

Enclosed please find cheque/ purchase order/Bankcard/ VISA/ MC

#__________________ for $____ (add $7 courier)

NAME:______________________________

ADDRESS:______________________________

COMPUTER:______________ SIGNED:______________

MICRO-EDUCATIONAL PTY LTD

Australia's largest computer mail-order company

GPA SUPERMODEM: $395

Makes the competition look sick ...

"All the features of a $1000 smart modem for less than the price of a dumb modem."

Look at our features:

- * Standalone, direct-connect serial modem. Hayes compatible.
- * 6809 microprocessor controlled
- * Auto-answer, auto-dial, auto-disconnect, Auto line turnaround
- * CCITT V21 and V23
- * V22 option, 1200 baud full dup **available now** for $190.
- * VIATEL software available $35 (Apple/IBM)
- * Plugs into any serial port
- * Automatic Baud rate selection
- * Mains powered & onboard speaker
- * Meets Telecom approval specs
- * Fully software controllable
- * Internal expansion slot
- * Computer cables (specify) $30

MODEM / FEATURES	GPA SUPER-MODEM	AVTEK MULTI-MODEM II	DATACRAFT 5003A	TULPI INTELLIGENT	SUPER NICE MODEM II	SCITEC BUSINESS 2200	NETCOMM SMART MODEM 123A
V21(300/300)	X	X	X	X	X		X
V22(1200/1200)	X(OPTION)			X	X	X	X
V23(1200/75)	X	X		X	X		X
AutoDial	X			X	X	X	X
AutoAnsw	X	X	X	X	X	X	X
Hayes	X			X	X	X	X
PRICE	$585 (with V.22) $395	$349	$480	$680	$699	$1144	$1610

(Prices from Oct 86 Your Computer.)

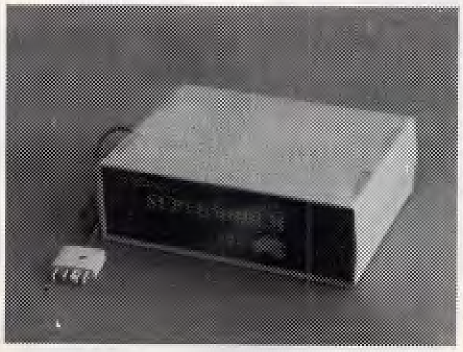
10 DAY FREE TRIAL

This really is a brilliant modem, but the only way you will ever find out for yourself is to order one. But you don't have to take my word for it. You can order a gpa SuperModem, try it out, and if it doesn't live up to your expectations send it back within a fortnight for a FULL REFUND. NO QUESTIONS ASKED. I could go on but the answer is to try it for yourself. We showed this ad to some of our best customers and they were sceptical that a $395 modem could do everything we claimed. But when they bought a gpa SuperModem they were ECSTATIC. It really is that good.

TO ORDER: Ring me now on (049)26 4122 and quote your credit card number for overnight delivery. Or mail your cheque, purchase order or credit card number on the enclosed order form. Mail to Micro-Educational Pty Ltd, 8/235 Darby St NEWCASTLE 2300

IN STOCK NOW

OVER 1300 SOLD!



"An excellent modem, well-suited to our needs." J Watson, Q.S.W.L. (Bought 10)

"The SuperModem does everything I have wanted it to do." G O'Brien

"I'm very pleased with the SuperModem. I have several corporate customers who are prepared to delay purchase pending Telecom approval. They are very pleased with the technical aspects of the equipment." J Borchers.

"Your SuperModem is superb! Everything works perfectly without the slightest problem." C Hansen

"Excellent value." R Williams.

ORDER FORM

Micro-Educational
8/235 Darby St
NEWCASTLE 2300

Dear George,

Please rush me ______ GPA SuperModem/s @ $359 ex/ $395 inc plus cable for my ______________ computer on 10 day approval. If I am not delighted with it I will send it back within a fortnight for a FULL REFUND.

Extras:

☐ V.22 $190 ☐ Cable $30 ☐ Viatel S/W $35

NAME:______________________

ADDRESS:______________________

____

P/CODE:______________

Enclosed please find cheque/ purchase order/ Bankcard/ VISA/ Mastercard

#______________________

for $__________

Add $7 per modem for insured overnight KWIKASAIR courier.

8/235 Darby St NEWCASTLE 2300 PH (049) 264122

BONDWELL PC

FOR THE EXECUTIVE ON THE MOVE!

$1950
(Incl. Tax)

Bondwell BW18

Transportable MS DOS 2.11 computer, weighs 13.2 kg, 640K, 9'' screen, two 360K drives.

$1800
(Incl. Tax)

Bondwell BW8

Lap Portable MS DOS 2.11 computer, weighs 4.5 kg, completely self contained with 512 RAM, 720K disk drive, backlit LCD screen and batteries.

FOR THE EXECUTIVE ON THE MOVE

Bondwell PC-AT Benchtop

80286 based (6 - 8MHZ switchable), MS DOS 3.2, 512K, 20Mb hard disk, Hercules colour card standard.

$4200
(Incl. Tax)

Bondwell PC-XT Benchtop

8088 based (4.77MHZ), one floppy, 20Mb hard disk, 640K, MS DOS 2.11, colour graphics adaptor, serial, parallel, joy stick, real time clock.

$2500 (Incl. Tax)

MICRO EDP & HARDWARE

9A/1 Leura Avenue, Claremont, W.A.
P.O. Box 91, Claremont, W.A. 6010

Phone (09) 384 5511

Telex: AA 96140

Prices are subject to change without notice

Fractal sets

The mathematical and graphical world of Mandelbrot and Julia sets is explored in a two-in-one article by Dr MM Novak and Jack Weber.

This feature consists of two articles about the Mandelbrot and Julia sets. The first, by Dr MM Novak explains the background and mathematics of Julia sets very clearly. It then goes on to describe in general how to explore this wonderful mathematical world on your computer. The second article, by Jack Weber, describes a fully-fledged program to explore Julia sets and Mandelbrot sets. It also describes an innovative algorithm to produce accurate intermediary results. This is a great improvement on previous programs and is a great time-saver, since all such programs require immense amounts of number-crunching.

The two articles are complementary and provide an ideal introduction to some of the more interesting parts of the world of fractals. Though the articles assume some knowledge of mathematics, the listing 'MacMand' which appears in Program File does not.

Julia sets

by Dr MM Novak

The fascination that came over me during my first encounter with the striking world of fractals has never left me. In fact, if anything, the grip became even tighter as I delved deeper into the realm of amazing forms that kept unfolding on my monitor. The visual representation of apparently mundane mathematical ideas resulted in stunning displays. The wealth of underlying imagery could not be conceived in the absence of computers, and it is only recently that this field has acquired a high-profile status. In this article, I aim to explain the essential concepts behind fractals.

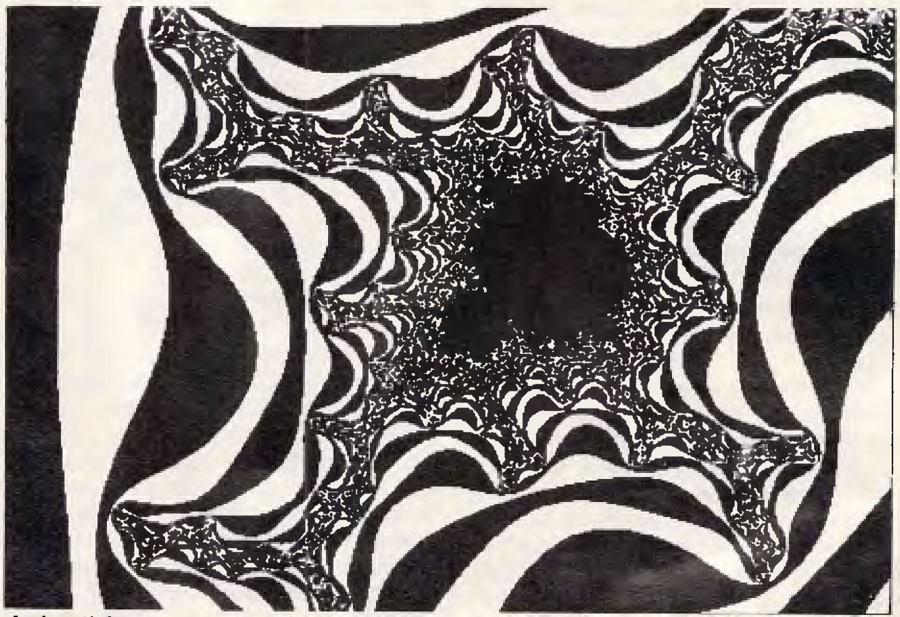
Down to basics

The basic elements of geometry are characterised by an integral dimension. For instance, a line has a dimension of 1, while a plane is a two-dimensional entity. No other objects with an intermediate dimension — for example, (1.7) — are possible in classical geometry.

However, more recently, the existence of objects with fractional dimension has been postulated. The name 'fractal' has been coined to describe such an entity. As this concept goes against our intuition, let us clarify its meaning by an example. Suppose we wish to measure the length of the coastline of an island. Clearly, as such a shape is very irregular to be measured directly, it is replaced by a series of straight line segments. Using a map, the determination of the length is, in principle, straightforward. We simply measure the island's circumference, along the bays and peninsulas, note the scale of the map and calculate the length of the coastline. If the scale on the map is large, the length that we obtain is approximate, as only the largest shapes are present. By choosing a more detailed map, additional bays and peninsulas become visible, hence increasing the circumference. Selecting a still finer map, yet smaller bays and peninsulas appear, and the overall length increases further.

This process can be carried out *ad infinitum*, and it is found that the coastal length is not well-defined and increases without a bound. Note that such a measurement is not restricted to an atlas, but can also be performed directly on the island itself. For instance, select a fixed length interval, say, with the dividers, and walk them along the coast. The total length can then be determined by multiplying the number of steps needed to cover the distance by the separation between the dividers. Now, if the interval between the arms of the divider is reduced and the whole process repeated, the circumference of the coastline becomes longer. Thus, as the interval gets smaller, the emergence of a more detailed structure increases the total length of the island.

Fractals are thus special, irregular



A detail from one part of the Mandelbrot set objects that defy description in terms of classical mathematics. These objects commonly appear in nature, and their description led to a new field known as fractal geometry. An imaginative book dealing with this matter was written by BB Mandelbrot. Very effective fractal curves can also be generated on a micro. This article is devoted to a more complex fractal set, often referred to as the Julia set. Such an entity appears during an iteration process in the complex plane. Let us clarify this notion by first introducing the concept of a complex number.

Complex concepts

The oldest and simplest number system ever known to man consists entirely of positive integers. Addition of signed numbers and zero forms a complete integer set. The first three arithmetic operations — namely addition, subtraction and multiplication of two numbers from this set — yields a number which is also an integer. However, division of two integers may produce a number that does not belong to the integer set, as it contains a fraction. A set of numbers containing all the fractional numbers that can be written as the ratio of two integers is known as the rational set.

Apart from rational numbers, other numbers exist in mathematics. One such number is the square root of 2 (SQR(2)) (=1.414213 . . .). As this cannot be expressed in terms of rational numbers (or simple fractions), it belongs to an irrational set of numbers. Together with the rational set, they are known as real numbers. The 'real' is in fact a misnomer, as there is nothing more real about this set than about, say, integers.

Within the realm of real numbers, we can solve any equation of the form $x^2 = A$ providing A is a positive number. The solution is then simply x=SQR (A). However, to solve the same equation when A is negative, another system of numbers, known as complex numbers, must be introduced.

The complex number is defined as consisting of an ordered pair of real numbers, subject to certain rules. It is normally written as c+id, where c and d are real numbers and i is a tag. We call c the real part and id the imaginary part of a complex number c+id. Complex numbers are often written as 'z', as in the standard formula z=x+iy where x and y are real numbers.

To follow the idea behind the Julia set, we must now introduce some rules concerning operations with complex numbers. Consider, then, two complex numbers, p=p1+ip2 and q=q1+iq2. The sum of the numbers p and q is again a complex number whose real part is equal to the sum of the real parts of p and q, and whose imaginary part is equal to the sum of the imaginary parts of p and q. That is, the sum of p and q is:
p + q = (p1 + q1) + i (p2 + q2)

The product of two complex numbers p and q is given by
p*q = (p1q1−p2q2) + i (p1q2+p2q1)
once again containing the real and imaginary parts. In deriving this expression, we have cross-multiplied each part of p and q and used the fact that $i^2 = -1$.

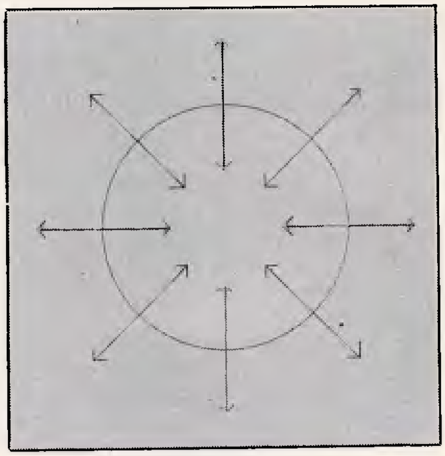
How can we visualise a complex number? The most common representation is known as an Argand diagram. In this scheme, a complex number is identified with a vector whose x-coordinate is equal to the real part and whose y-coordinate is identified with the imaginary part of a complex number. The absolute value (or the size) of a complex number is then equal to the length of an associated vector and can be expressed as:
$|x+iy| = SQR\ (x^2 + y^2)$
That is, the absolute value of a complex number is equal to the square root of the sum of its real and imaginary parts.

Iteration

First of all, what is an iteration? This concept is best explained by an example. Denote a function of x by f(x), where x is called an argument. Now, repeat this procedure by treating f(x) as an argument and find a function f that is f(f(x)). In the next step, consider f(f(x)) as an argument and obtain f(f(f(x))), and so on. An iteration can thus be described as a repeated evaluation of a function, whereby functional values of one step become arguments of the next.

For the moment, consider only the real numbers and choose a function to be a squaring function. That is, for every real number x, the functional value of x is x^2. By iteration, we find a sequence x^2, $(x^2)^2$, $((x^2)^2)^2$, and so on. Repeating the squaring of every real number, we find that, depending on the initial argument x, the function either remains unity or tends towards one of two values — zero or infinity (depending on whether the absolute value of x is greater or less than 1). By increasing the number of iteration steps, a point is attracted closer and closer until it finally reaches one of these values. The points of attraction are known as attractors; thus, there are two attractors, separated by a boundary, for a squaring function in the realm of real numbers.

Let us now include the complex numbers and square them repeatedly. We find that, following the iteration process, all complex numbers are attracted either to zero, infinity, or lie on a circle with unit radius. Here, the circle represents the boundary between two dynamically different regions. That is, all points that are outside this boundary (see the diagram below) move towards infinity, while all the points on the inside migrate towards zero when squared repeatedly.



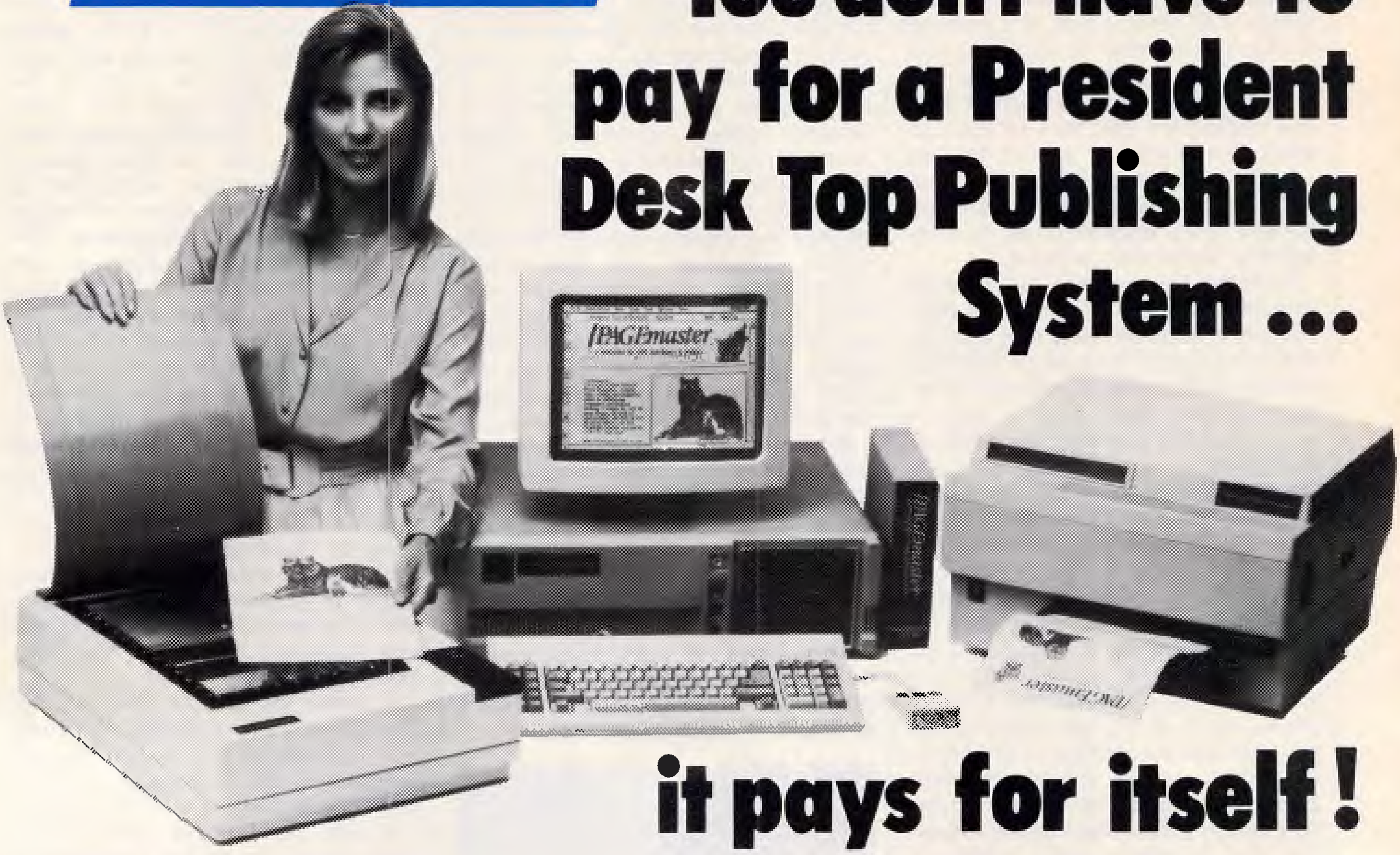
The graphical representation of the iteration process, just described, is not very imaginative. However, a dramatic change takes place when a constant complex number is added at each iteration step. The process that describes the Julia set can now be expressed as x ==› x^2 + c where c is, in general, a complex number and the sign ==› means 'replaced by'. The addition of c to the iteration changes the position of the inner attractor — it is no longer equal to zero. Further, the circular boundary is also deformed and forms an irregular shape. A closer examination of this boundary reveals, in fact, that any minute part is just as irregular, bearing a remarkable similarity to other parts along the curve. Such a boundary is another example of a fractal structure.

How can this iteration process be visualised using a micro? Consider a complex number z = x + iy and a constant c = $c_r + ic_1$. The iteration process z = = › z^2 + c can be decomposed, in view of the operations with

president

...The Australian way!

You don't have to pay for a President Desk Top Publishing System ...



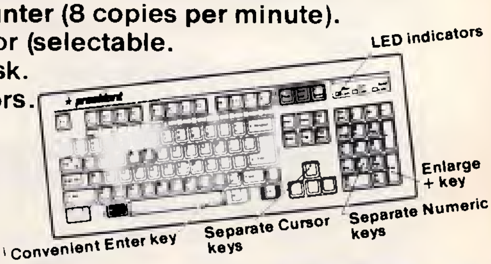
it pays for itself!

Check our features and you'll see why we're ahead of the rest.

The President 286 Publisher Computer (specially manufactured in Australia by President), linked with the AVR-300 Flat-bed Image Scanner and MEGAScan software will give you the speed and power required for professional publishing and office alike.

The President 286 System includes:

- Advanced Vision Research 300 Flat-bed Image Scanner and MEGAScan Software.
- Modified Cannon based laser printer (8 copies per minute).
- 6-8-10 mega HZ 80286 processor (selectable.
- 47 megabytes voice coil hard disk.
- Optional E.G.A. or WYSE Monitors.
- 60 megabytes tape back-up.
- 1 3 megabyte MegaBuffer.
- CGA Monitor and Card.
- 1 megabyte RAM.
- A 101 Key Publishing Keyboard.



President Computers P/L Head Office

Hornsby	(02) 476 2700
Bondi Junction	(02) 387 7366
Campbelltown	(046) 26 8166

President Computers Victoria

Carlton	(03) 347 0555

President Computers Marketing

Adelaide	(08) 212 1799

President Computers Queensland

Labrador	(075) 37 4641
F'tude Valley	(07) 52 3288
South Side	(07) 341 3258
Darwin	(089) 81 5905
Perth	(09) 328 6522
Tasmania	(003) 315 302
Albury	(060) 21 4481
Dubbo	(068) 82 3833
New Zealand	(64) 9 790527
New Guinea	6755 254422

president

...The Australian way!

DeskTop Publishing Division.

complex numbers outlined earlier, into real and imaginary parts as:

$x_n +_1 = x_n^2 — y_n^2 + c_r$
$y_n + _1 = 2x_n y_n + c_1$

This prescription tells us how to find the next term (denoted by subscript n+1) in the sequence, from the current term (represented by subscript n). In other words, the real part of the next number is found by subtracting the squares of the real and imaginary parts of the current term and adding the real part of the constant. The imaginary part of the next number is equal to twice the product of the real and imaginary parts of the current term increased by the imaginary part of the constant.

Suppose that we wish to look at all complex numbers in a specified area. To define such an area, it is convenient to associate the bottom left-hand corner of the screen with one complex number, say, $z_{min} = (x_{min} + iy_{min})$, and the top right-hand corner with another, $z_{max} = (x_{max} + iy_{max})$. On the Commodore 128, for example, the resolution of the multi-colour screen is 160 pixels in the x-direction and 200 pixels in the y-direction. Therefore, we define the x-increment as $dx= (x_{max} - x_{min})/160$ and the y-increment as $dy = (y_{max} - y_{min})/200$. The first x value in each line is equal to x_{min}. The next two x values are $x_2 =x_i + d_x$, $x_3 =x_2 + dx$, and so on, until the last x-value in the line is $x_{160} = x_{159} + dx$. Similar relations apply to y-values. To implement the iteration process, execute the following loop for the complex number z corresponding to each pixel:

1) Replace z by $z^2 + c$, as shown in the example above.
2) Find the absolute value of this new z.
3) If the absolute value of z is greater than or equal to 2, exit the loop.
4) Adjust the iteration counter.
5) If count is larger than preset value, exit the loop.

The value of the counter, on leaving the loop, shows how quickly a given number (corresponding to a pixel under examination) is being attracted to infinity. The smaller the count, the stronger is the attraction. Obviously, it isn't possible to iterate each initial z a fixed number of times, as the absolute value of many of them would grow so rapidly as to exceed the capacity of a computer after only a few repeated squarings. Instead, it suffices to check whether the size of the number exceeds 2. If the answer is positive, then the number will definitely reach infinity in the limit of the iteration sequence.

The colour assigned to the corresponding pixel is determined from the value reached by the counter. The colour coding depicts how fast a given point approaches infinity. The range of the counter values can be divided into smaller groups, each of which is represented by one of the available colours. Or, each value of the counter can be represented by another colour, continually cycling through the available colours. Or, each value of the counter can be represented by another colour, continually cycling through the available colour spectrum. All the points whose magnitude remain less than 2 after a large number of iterations, say 500, belong, for all practical purposes, to the Julia set, and are unlikely to cross the boundary even if the number of iterations increases.

From the information presented here, it is straightforward to write a Basic routine that will examine the range of complex numbers undergoing repeated squaring. However, such a program suffers from one major disadvantage — it is very slow. To obtain fine detail it may take several days of continuous execution, and this timescale is bound to discourage even the most patient and determined computer addicts!

Mandelbrot sets

by Jack Weber

Considering its simplicity, the formula $z^2 + k$ (where $z = x + iy$) opens a window into a world of enormous complexity. Iterated over and over again it creates the, by now very familiar, Mandelbrot set. Many programs have been written to plot the Mandelbrot set and its surroundings, but what is often ignored is that, lurking as it were behind the Mandelbrot set, is an infinite number of Julia sets. Whereas there is but one Mandelbrot set, created by initialising z to 0 and plotting the function for different values of C, there are an infinite number of Julia sets, each corresponding to a different initial value of z. More delicate than the Mandelbrot set but every bit as intricate, these Julia sets come in many forms with names like Fatou dust, Cantor set and San Marco fractal. The program 'MacMand' in Program File plots them all, as well as the Mandelbrot set which gives birth to them. Although written for the Macintosh with its monochrome display, MacMand can be adapted to any colour or monochrome computer.

Mandelbrot algorithms

The basic operation behind all these fractals is iteration. That is, we work out the formula $z^2 + k$ for certain values of z and k, then use this result as our new value of z and do the same again. And again, and again, and again . . . Repeated many times in this way, the formula gives a sequence of numbers which will do one of two things: either get bigger and bigger, rushing off towards infinity; or move about within a fairly small range of low values, perhaps jumping about quite violently, but never getting big enough to be sucked away. The only complication is that both z and k are complex numbers — that is, numbers which have a real part and an imaginary part containing the square root of minus one. This complicates the arithmetic because Basic does not include functions for handling complex numbers, but, on the other hand, it is well-suited to screen display because x and y axes can represent the real and imaginary values of the numbers.

In order to generate the Mandelbrot set, we always begin by setting $z = 0$ and specifying a value for the constant k. Our first result is therefore $z^2 + k = 0^2 + k = k$. Putting this back into the formula gives $k^2 + k$ which, at the next stage, becomes $(k^2 + k)^2 + k$, and so on. If this series never grows towards infinity, then our value of k is a member of the Mandelbrot set. To plot this set we treat the screen as representing a range of k values: each pixel corresponds to a unique value of k with its combination of real part (x coordinate) and imaginary part (y coordinate). Using a pair of nested loops we can scan every point on the screen, find its corresponding value of k, substitute it into the formula, iterate it, then plot that pixel according to the result.

As it is plotted over a range of k values, the Mandelbrot set can be thought of as lying in the k plane; the Julia sets, on the other hand, lie in the z plane. We specify in advance the constant k that we are using, then scan the screen to give a range of z values which will be the starting points of the iterations. In most respects the process is very similar to plotting the Mandelbrot set, except that k is unchanged over the whole

More good news from the front line!

Mac
IBM PC
Apple

Let's face it. You've spent a lot of hard-earned cash to get your computer, and it's a bit of a grind to discover you have to shell out a hell of a lot more for software!

And if you're after really powerful programs for your computer - **IBM PC/compatible, Apple II** or **Mac** - the prices all seem to be in the $100 to $400 range. Why on earth should you have to pay that much, just so you can make full use of your computer?

Well, now you don't have to. Interface Publications has been in the el cheapo software business since August 1985 (and we've got thousands of happy, smiling customers to show we've been pretty busy since then) and we've just released our latest catalogue. *When you get your copy, you'll see that instead of prices from $100 to $400 and up, our software starts at just $17.00 a disk!* We provide a full support service for all the material we sell. We use PC's, Apples and Macs ourselves, so we have a fair idea what we're talking about (some of the time!), and we're constantly adding to our software range.

Tim Hartnell, head of Interface Publications, makes a simple pledge: We want you to get the maximum value for your money, so we provide a full support service for everything we distribute. If you want advice, or assistance, please call us.

Software which gives you the power... without the price!

IBM PC/COMPATIBLES

☐ **Assembly Language Tutorial and Routines.** If you want to master assembly language programming on the IBM PC, this disk (our best-seller) is for you. $17.00

☐ **Ledger.** A sophisticated, yet easy-to-use general ledger program, full instructions $17

☐ **Replicating Reality: Developing & Exploring Computer Simulations.** 96-page printed manual, plus disk, designed to introduce you to the potential of computer simulations. Working mechanisms/theories behind simulation creation demonstrated in detail. Many programs. $39.95

☐ **Exploring Artificial Intelligence on your IBM PC.** Printed manual plus disk to explore the fascinating world of AI. Discover the history, theory and practice of AI. Programs include BLOCKWORLD, SYLLOGY and X-SPURT. $39.95

☐ **The Pascal Tutor.** Two-disks, instruction manual, plus copy of book *Pascal for Human Beings*. $45.95

☐ **IBM PC Programmer's ToolKit.** 25 very valuable programs, for serious PC programmers, including SECTSAVE, AUTODEX, REMSTRIP, RV-EDIT. $39.95

APPLE IIc/IIe/II+

☐ **Backgammon Plus.** Great games disk, includes *Backgammon, Air Simulation, Tennis* and more! $17.00

☐ **FreeWriter.** Fully-professional word processor, with help screens. (not for II+) $17.00

☐ **Replicating Reality: Developing & Exploring Computer Simulations.** 96-page printed manual, plus disk, designed to introduce you to the potential of computer simulations. Working mechanisms and theories behind simulation creation demonstrated in detail. Many programs to run on your Apple with this package. $39.95

☐ **Exploring Artificial Intelligence on your Apple.** Printed manual plus disk to explore the fascinating world of AI. Discover the history, theory and practice of AI. Programs include BLOCKWORLD, SYLLOGY and X-SPURT. $39.95

☐ **The Signwriter.** Produce great big signs, greetings, with any printer. $24.95

☐ **Communications Four.** A 4-disk set so you, your Apple and a modem can start your own bulletin board, plus numerous general communications programs. $39.00

MACINTOSH

☐ **Games Volume One.** 11 great games inc. BACKGAMMON, MISSILE COMMAND, ASTEROIDS & SPACE INVADERS. $22.00

☐ **MacBonanza.** Extraordinary range of application and utility programs for serious Mac users, including BANNER to printer large signs on your ImageWriter, the visual parallel programming language DATAFLOW, a FILE FILTER to strip linefeeds, control characters, high bit or add linefeeds, the SCRATCHPAD to allow you to create text and comment files on your disks, MENU EDIT, VIEW PAINT, a 512K Ramdisk, and more! $22.00

☐ **McFonts #1.** 25 new incredible fonts $22.00

☐ **McFonts #2.** 25 more amazing fonts. $22.00

☐ **Code-Cracker.** Copy protected programs $22.00

Interface Publications (Aust.) P/L,
Chelsea House, 34 Camp St.,
Chelsea, Vic., 3196 *(03) 772 7566*

Please send me the indicated products for my
☐ **IBM PC** ☐ **Apple** ☐ **Mac**

☐ **Please send me the new catalogue**

Total value of order	$______
PLUS 20% for sales tax	$______
PLUS $3.00 post/packing	$ 3.00
Total for this order	$______

I enclose cheque, or charge my
☐ Bankcard ☐ Visa
*Card no:*______________________

Name ______________________

Address ______________________

______________Postcode ______

apc/1/87

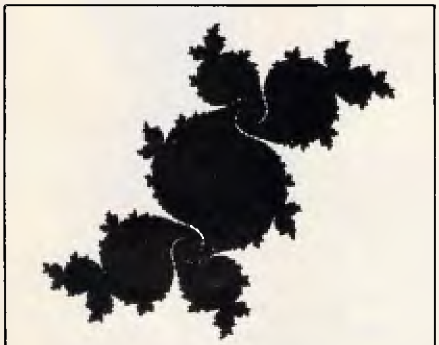
Blank disks - Not Le Crappie!

Instead of some unknown, unbranded questionable blank disks from Taiwan, Interface sells only the reknowned *Le Floppie* disks from Imagineering.

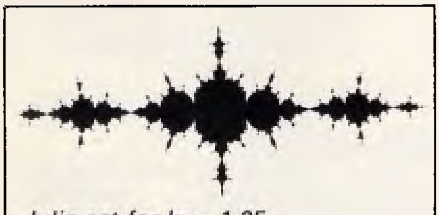
☐ ___ boxes of SSDD 5 1/4 (suitable Apple) - $12.50 per box of 10
☐ ___ boxes of DSDD 5 1/4 (suitable IBM) - $15.95 per box of 10
☐ ___ boxes of SSDD 3 1/2 (suitable Mac) - $49.95 per box of 10

screen and our starting value of z is not 0 but the value given by the point to be plotted.

While relatively simple to describe and to program, all these processes are very demanding of computer power because, for every point on the screen, a complicated calculation needs to be done many times over — producing a complete plot may take hours or even days. The first priority, therefore, is to make the computation as efficient as possible and to minimise the time spent waiting for output to appear.



Julia set for k=.11+i.6557



Julia set for k=−1.25

Most processor time is spent in one of the two routines — Mandcalc and Juliacalc — which perform the iterations for each pixel within a WHILE ... WEND loop. The maximum number of iterations to be done is preset by the user through the variable, level %, but the loop tests also for the value that has been reached in the iteration. If the modulus of the result (given by the square root of the sum of the squares of the real part and imaginary part) exceeds two, then the result will inevitably continue to grow towards infinity; so, there is no point in iterating any further beyond this threshold value. To avoid wasting time, though, the square root is not calculated; instead, the sum of the squares is compared against four.

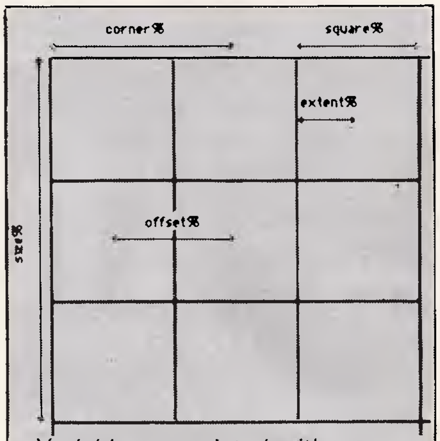
When iteration has been completed we have, in the loop counter i%, a measure of how many iterations (up to level %) were needed to reach the threshold. This provides the basis for two alternative modes of plotting: either we can use the value of i% MOD 2 to select white or black pixels for odd and even values of i%, which maps how fast points outside the Mandelbrot set are attracted to infinity. Or, we can choose to plot only those pixels which reached level % without exceeding the threshold; this gives a plot that approximates to the Mandelbrot set. The higher we set level %, the more accurately we find the Mandelbrot set, but it does take longer to do.

Waiting for the display to build up pixel by pixel can be very frustrating, particularly if it becomes apparent towards the end that one of the parameters was not properly set. MacMand uses a tessellation technique to provide almost instantaneous output over the whole screen at low resolution, then gradually increases the resolution up to the maximum.

Tessellation routines

The program begins by stepping across a fairly coarse grid of points, plotting large squares on the basis of these points. Then it scans the screen again and again with successively finer grids, drawing smaller squares each time until just single pixels are being plotted. The basic idea is not new, but it has usually been done by taking grid sizes which are powers of two (128, 64, 32 . . ., 2, 1) and plotting squares which have the calculated pixel as one of their corners. This is easy to program but, at coarser scales, destroys the shape of many patterns because each square is so unbalanced. MacMand plots squares that have the calculated pixel at the centre, which retains any symmetry in the pattern but requires a more complex algorithm based on powers of three.

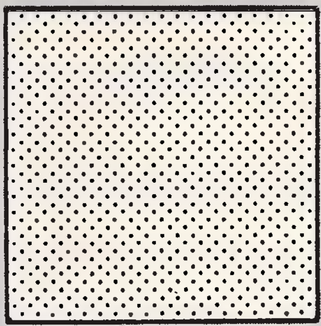
On the first pass we plot squares with 81 pixels on a side, using the centre pixel to define the colour. Subsequent scans divide each of the previous squares into nine smaller ones and plot the other eight of these, again using the centre pixel of each one to define the new squares (see figure).



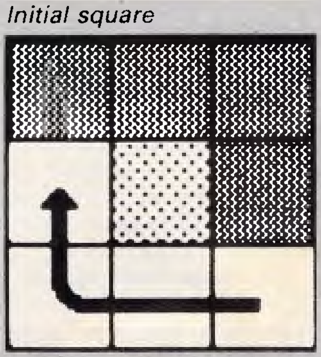
Variables associated with the tiling routines

The result is not only that we retain symmetrical features of the pattern throughout all stages, but, more importantly, the algorithm automatically avoids recalculating any pixel that has already been done. This means that very little is added to the execution time and, unlike the powers of two tessellations, there is no need to test each pixel to see whether it has already been calculated in a previous stage.

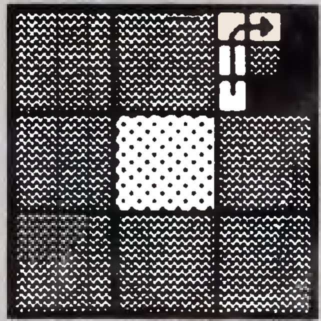
The two routines which perform the tiling are called Scan and Tesselate. They use a number of variables to define the size and position of the squares as shown.



Initial square



First tessellation



Second tessellation

Defining new squares

At any point during the plotting process, the menu bar offers a num-

50 FREE DISKETTES, LOVE HAL.

With every purchase of a Hal 2 Personal computer during January or until stocks last. Have a Hal of a New Year!

HAL 2 Standard Configuration

Processor: Intel 8088-2 4.77/8MHz (switchable)

Memory: 640k, all IC in sockets

Storage: dual 360k FDD

Monitor controller: Hercules/color

Multi I/O: parallel, serial (2nd optional) and games ports, real time clock, disk drive controller

Keyboard: 84 keys with LED indicator (AT type)

Power supply: 150w power supply

Case: flip top AT type

Monitor: TTL monochrome/color

Operating system: fully licensed MS-DOS

20MB Winchester (optional): Tandon

Warranty: 12 months

Dealer enquiries: NSW — contact **Michael Wee 516 5573, 519 8240** Qld — contact **Roger Hunt 076 39 1110**

Hal authorised dealers: New South Wales: **Drummoyne,** Microstation, 819 6348; **Chippendale**, Computer Exchange, 698 8855; **Brookvale**, The Computer Factory, 938 2522; **City**, Data Discounts, 238 2195; **St. Leonards**, Advance Technical Sales, 437 6844; **Hornsby**, Intelsoft Aust., 476 4543; **Parramatta**, Foremost Office Equipment Pty Ltd, 635 5477; **Newcastle**, Pacific Office Machines, 044 22358; **Lismore**, Lismore Electronics, 066 217998; **Grafton**, Grafton Computer Centre, 066 426790; Queensland: **Maryborough**, Kellor Electronics, 07 214559; **Ipswich**, Computer Magic, 07 8161830; **Nambour**, Nambour Electronics, 071 411604; **Toowoomba**, Hunts Computer Shop, 076 385001; **Rockhampton**, Access Electronics, 079 278757; **Warwick**, Audivision, 076 613131; Victoria: **Melbourne**, Cybernetic Research Pty Ltd, 03 5294844

HAL Australian sole distributor: Tufula Pty Ltd, subsidiary of Eastern Resources of Australia Ltd.

ber of choices through a pull-down menu called Fractal. The first is Zoom-in which allows any part of the plot to be selected by dragging with the mouse and expanded to fill the screen.

Whatever the proportions of the selected region, MacMand will include the whole rectangle and add to it to bring it up to 3:2 aspect ratio of the display window. The second menu choice is offered only when plotting a Mandelbrot set; it allows the user to point with the mouse to any point of the k-plane which is displayed on the screen, and will plot the Julia set defined by that point. A little experience with this facility will soon show that certain forms of Julia set are associated with particular regions of the Mandelbrot set.

Finally, there are two menu options which allow a partially completed plot to be saved to disk at any time and later reloaded so that plotting picks up from the point where it was interrupted. Any number of plots may be saved, up to the capacity of the disk. The computer will automatically ask for a filename for each one being stored, and will display a scrollable list of available plots when resuming. When a partially completed plot has been reloaded, the routine Firststage is used to complete the current level of tessellation before going back into the main Scan routine.

Conclusion

Clearly, fractals like these can benefit a greal deal from the sensible use of colour, but there is also a great clarity in seeing them in black and white. The program could quite easily be adapted to other computers, colour to monochrome; the plotting routines in particular should be easy to convert, allowing just for differences in screen resolution. Most of the rest of the program is concerned with the input of parameters and, because it relies heavily on the Macintosh user interface, is very machine specific. However, nothing more complicated than a number of INPUT statements is needed to get the necessary values into the computer. Obviously the routines for zooming-in and picking a point from the Mandlebrot set to form a Julia set are designed to operate with a mouse, but they could also be adapted to make use of cursor control keys.

Bibliography

Anyone wanting to study these complex fractals with anything more than a passing interest should consult the following publications:

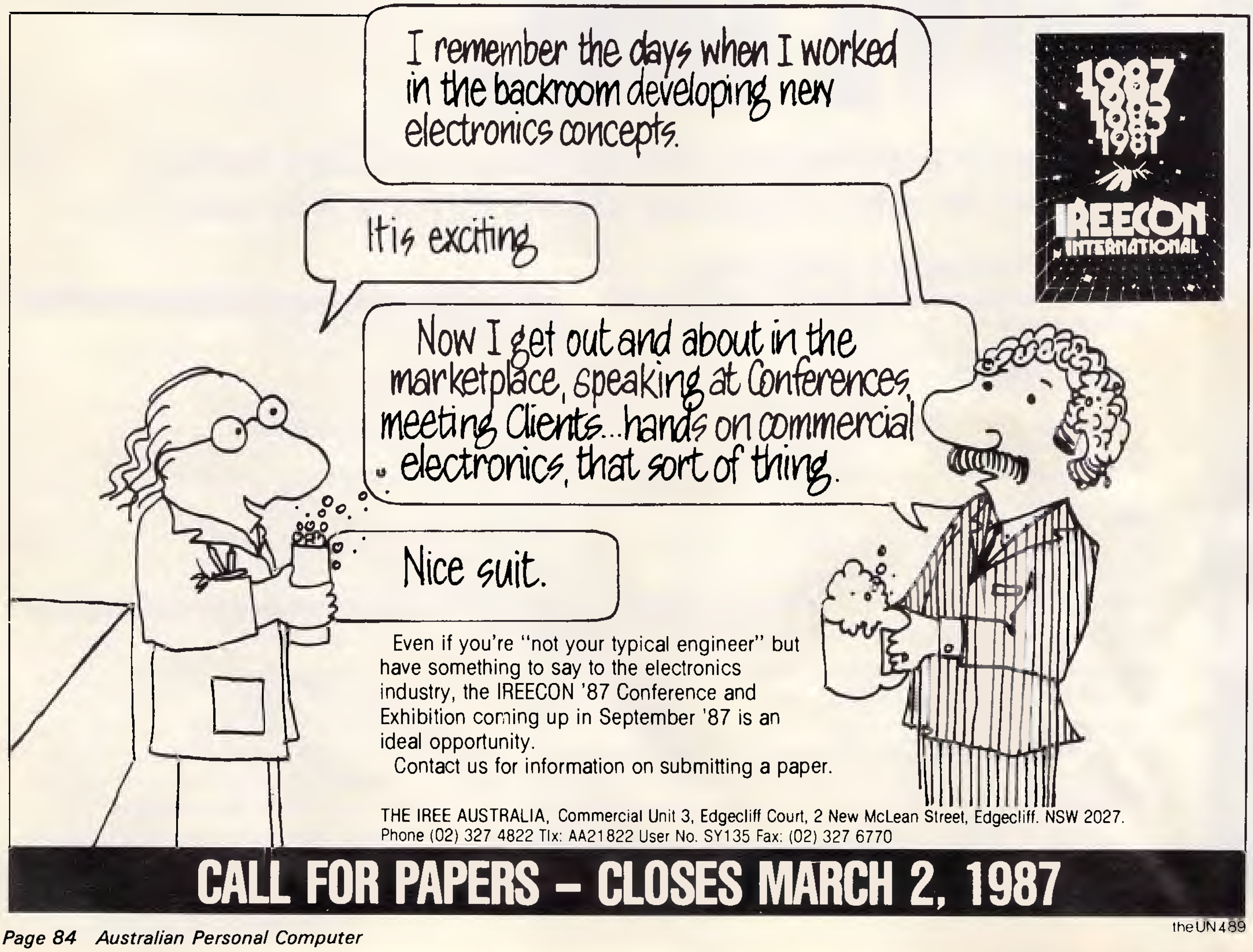
Computer Recreations by AK Dewdney (Scientific American, August 1985)

The Fractal Geometry of Nature by BB Mandelbrot (WH Freeman, 1982)

The Beauty of Fractals by HO Peitgen and PH Richter (Springer Verlag, 1986)

Advanced Graphics with the Commodore 128 by Dr MM Novak (Macmillan, 1986)

END


I remember the days when I worked in the backroom developing new electronics concepts.
It is exciting
Now I get out and about in the marketplace, speaking at Conferences, meeting Clients...hands on commercial electronics, that sort of thing.
Nice suit.
1987
1985
1983
1981
IREECON
INTERNATIONAL

Even if you're "not your typical engineer" but have something to say to the electronics industry, the IREECON '87 Conference and Exhibition coming up in September '87 is an ideal opportunity.

Contact us for information on submitting a paper.

THE IREE AUSTRALIA, Commercial Unit 3, Edgecliff Court, 2 New McLean Street, Edgecliff. NSW 2027.
Phone (02) 327 4822 Tlx: AA21822 User No. SY135 Fax: (02) 327 6770

CALL FOR PAPERS – CLOSES MARCH 2, 1987

theUN489

MCA

Micron Computers (Australia)

QUALITY PRODUCTS, QUALITY SERVICE (Buy Direct from the IMPORTER and SAVE!!)

75 Irving Street
Footscray 3011
Phone: 689 6444 (3 lines)
Fax: 689 6190

SPECIALISTS IN SYSTEMS FOR OFFICE, SCHOOLS AND HOME
FINEST IBM COMPATABLE SYSTEMS
★★★ ALL SYSTEMS WITH 12 MONTH WARRANTY ★★★
★★★ ALL JAPANESE COMPONENTS ★★★

631 Glenhuntly Road
South Caulfield
Phone: (03) 528 6692
★ Now in South Australia
Phone (08) 79 8838
399 Glen Osmond Road
Glen Osmond

MICRON WISHES EVERYONE
A MERRY CHRISTMAS
AND A HAPPY NEW YEAR

★ These prices definitely valid only until 24th December, 1986 ★

Thank you for your support during 1986

MICRON PC/XT TURBO

ONLY TILL CHRISTMAS **$1295**

- 640K RAM ON MOTHERBOARD
- 8088-2 PROCESSOR
- PROVISION FOR 8087-2 CO-PROCESSOR
- 8 EXPANSION SLOTS
- 2 360K DOUBLE SIDED NATIONAL DISK DRIVES
- CENTRONICS PARALLEL SERIAL (second optional), GAMES PORTS
- REAL TIME CLOCK CALENDAR, BATTERY BACK-UP
- AT STYLE KEYBOARD
- 150 WATT POWER SUPPLY
- RESET BUTTON
- KEYBOARD LOCK
- FULL 12 MONTH **WRITTEN** WARRANTY ON PARTS/LABOUR

WOW!
SPECIAL
5¼" DISKS
SINGLE SIDED
$15
DOUBLE SIDED
$19
BEAT THAT

MICRON'S NEW 10+ CARD

One card does all.
- Clock/calendar • 2 serial ports
- Parallel port • Light pen port
- Dual disk drive controller
- Displays RGB color/composite, TTL monochrome, also dual frequency TTL monitors • Can be installed in any PC using *only* 1 (one) slot.

$ CALL

DISK STORAGE
HOLDS 100 DISKS.
$23.00

ORIGINAL IBM PC
D.O.S. 3.1
$90

MONITORS

MONOCHROME	
COMPOSITE	$200
TTL	$220

PRINTERS

EPSON LX80 **$484**	GEMINI 15" **$720**
SUPER 5 1201 **$547**	SUPER 5 1000 **$500**
OLYMPIA NP165 **$495**	
CANNON 1080A **$565**	EPSON LX86 **$519**
RIBBON FOR LX80-86 =	$13.50
RIBBON FOR 1201-1000 =	$22.74

SEAGATE
20 MEG
HARD DISK
W/CONTROLLER
$955

MICRON PACKAGE

- Micron PC/XT Turbo
- NLQ Printer
- Original DOS 3-1
- Samsung swivel base composite Monitor

ONLY $1999

WE STOCK MANY REFERENCE MANUALS
$CALL US

MAIL ORDER NOW!
Call direct! Call today!
***DELIVERY AUSTRALIA WIDE**

LOOK AT THIS!!!
Z-NIX MOUSE
ONLY $115
Normally $140

* All Prices Include Sales Tax

- *IBM is a Registered Trademark of International Business Machines.*
- *Prices subject to change*

MASTERCARD/BANKCARD /VISA ACCEPTED

* CALL MICRON FOR A DEALER NEAREST YOU

PRICES CRASH

There's no catch — these prices INCLUDE Sales Tax
(For ex tax prices deduct 13.8%). Low RENTALS available

NEC APC IV

- 40 Mb quick access hard disc
- 1.2 Mb floppy (reads 360K and 720K)
- Colour monitor and 640K RAM included

Colour Graphics: $7,582 **Advanced Graphics: $7,974** **Power Graphics: $9,345**

(Note: The APC IV is totally 'AT' hardware/software compatible)

OLIVETTI M24

- 20 Mb hard disc
- 640K RAM
- Monochrome monitor

PLUS NEC P7 24-pin PRINTER: $5,845

OSBORNE 'AT'

- 20 Mb hard disc
- 1.2 Mb floppy drive
- Thomson monitor

PLUS NEC P7 136 col. PRINTER: $5,995

NEC PRINTERS

- 24-pin letter quality
- 8K buffer
- 5000 hours between failures

P6 (80 col.):	**$808**	**P7 (136 col.):**	**$1,053**
Pinfeed tractor:	**$73**	**Pinfeed tractor:**	**$109**
Cut sheet feeder:	**$355**	**Cut sheet feeder:**	**$440**
P5 Parallel:	**$1,536**	**P6 colour:**	**$995**
P5XL parallel, colour:	**$1,949**	**P7 colour:**	**$1,259**
ELF daisy wheel:	**$653**	**3500 daisy wheel:**	**$1,762**

Please phone for prices on BROTHER and TOSHIBA printers, A.T.S. Practice System, Enable, Open Access, E.B.A., Microsoft software.

N.S.W.: (02) 858-5999 1st Flr., 1039a Victoria Road, West Ryde, 2114
VIC: (03) 690-9196 7th Flr., 96 Albert Rd., South Melbourne, 3205
QLD: (07) 221-6198 2nd Flr., 40 Queen St., Brisbane, 4000
S.A.: (08) 51-3947 2nd Flr., 100 Currie St., Adelaide, 5000
W.A. (09) 328-2972 2nd Flr., 60 Stirling Street, Perth, 6000

A.T.S. COMPUTING

"Advanced Technology + Service"

SCREENTEST

Newsroom & Fleet St Editor

A new breed of software known as 'desktop publishing' has brought the capability and quality of the professional typesetters to the computerised company. Nick Walker looks at two current offerings.

It's amazing to think that only one year ago, a package called Pagemaker for the Apple Macintosh was heralded as software totally different from anything seen before. Pagemaker has since become one of many 'page-layout' packages, and a whole genre of microcomputing called 'desktop publishing' has opened up around such packages.

Page-layout packages, for those who have still to discover them, allow you to arrange text and graphics as pages, in the same format as a newsletter, magazine or newspaper. However, this alone is not the reason for the success of page-layout packages. There would be little point in producing a page of text on a micro if the only way of printing it were the crude output of a dot-matrix printer. It was the advent of affordable laser printers offering text approaching typeset quality and high-quality graphics that made desktop publishing possible.

The graphical nature of the Apple Macintosh makes it an ideal machine for this type of application, but the majority of users use an IBM PC or compatible. Despite the difficulty of creating page-layout packages on the low-resolution IBM PC, there are now many to choose from and the numbers are growing steadily. In the following review I shall be looking at two such packages: Newsroom from Ariolasoft, and Fleet Street Editor from Mirrorsoft.

In keeping with the current pricing trend caused by the launch of the Amstrad PC1512, both products are very competitively priced. Newsroom sells for a mere $102 while Fleet Street Editor retails at $599. Both programs are repackaged versions of existing American products.

Newsroom

The minimum configuration to run Newsroom on an IBM PC is 256k of RAM, two floppy disk drives, a CGA (colour graphics adaptor), an expansion card, a colour monitor and a printer. Versions are also available for the IBM PC/JX, Commodore 64 and Apple II. Although it *is* possible to transfer the program onto a hard disk, there is little point in doing so. The copy-protection on Newsroom requires you to insert the master system disk everytime you run the package.

Design

Newsroom is supplied on two disk—one system disk and one 'Clip-Art' disk of pictures to use in your page layout. Running the program results in a very tacky cartoon drawing of the inside of a newspaper office, consisting of photo laboratory, press, wire service, banner copy desk and layout.

This is in fact the main menu and the six areas shown are options selected with the IBM's cursor keys. Selecting the option you want by pressing the ALT key will take you into that option. I can't imagine why Springboard (the original American manufacturers of Newsroom) chose the ALT key in preference to the Return key, which is such a popular key with memory-resident programs that using it alone like this is asking for key-conflict problems. In practice, the problem is not that the memory-resident program won't work, it's just that invoking such a program frequently results in an unintentional command also being issued.

As an alternative to the cursor and ALT key, you can use an IBM-style analogue joystick. (Amstrad PC owners should note that their joystick port is not compatible with that of the IBM). Newsroom also supports mice, and Commodore 64 owners can use the Koala touch-tablet as an alternative input device while Apple II owners can use the Apple mouse.

Page layout

A page in Newsroom is made up of a number of panels, each of which is designed separately. Two paper sizes are supported: A4 letter size and legal size; a page consists of two columns of four panels on A4 or two columns of five panels on legal. The top two panels of any page can be replaced with a banner or masthead for the front page. This arrangement severely restricts the kind of page layouts you can produce. The only layout that is easily produced is a two-column page. A single-column page is just about possible but requires frequent switching between panels, and three columns or above is totally impossible.

LOWEST EVER

STUDENT PRICE ON (AND THAT MEANS YOU!)

IBM • PC* • JX

All models include HI-RES COLOUR MONITOR

FROM

$1164

Yes! thats
INC. TAX

The new IBM JX incorporates some of the most advanced technology ever applied to personal computers — making it a perfect match for today's easier and more powerful application software packages.

The IBM JX features a powerful 16-bit 8088 microprocessor, supported by the latest high-density gate array components to reduce both size and cost while increasing reliability and performance.

The JX provides a high degree of compatibility with the IBM PC family, giving it an outstanding software library to draw from.

A wide range of easy-to-use IBM software helps novice users become productive with minimal learning time.

SPECIAL OFFER
DOS 3.2 & 720K
Drive upgrade kit
$138

Model Features

JX 1

- — 64K Memory
- — No drives
- — Remote Infra Red KB
- — Colour Monitor
- — Parallel/Joystick Ports x 2
- — Lightpen & Audio Port
- — Cartridge Port (great for Lotus)
- — DOS 2.10/Basic Inc.
- — Sampler/Intro Programs

$1164 inc tax

JX 2

- — 128K Memory
- — 1 x 360K drive
- — Remote Infra Red KB
- — Colour Monitor
- — Parallel/Joystick Ports x 2
- — Lightpen & Audio Port
- — Cartridge Port (great for Lotus)
- — DOS 2.10/Basic Inc.
- — Sampler/Intro Programs

$1491 inc tax

JX 3

- — 256K Memory
- — 2 x 360K drives
- — Remote Infra Red KB
- — Colour Monitor
- — Parallel/Joystick Ports x 2
- — Lightpen & Audio Port
- — Cartridge Port (great for Lotus)
- — DOS 2.10/Basic Inc.
- — Sampler/Intro Programs

$1762 inc tax

MAIL ORDER NOW!
Call direct! Call today!
Shepparton (058) 21 7155

CAMBERWELL: 519 Burke Road (03) 20 7895
BENDIGO: 419 Hargreaves Street (054) 43 4866
SHEPPARTON: 11 Edward Street (058) 21 7155

DataParts

The best computer people in the country.

or Authorised Agents
WOLUNDRY COMPUTERS: Wagga (069) 21 6466

* Advertised prices must be quoted
* Prices and products subject to change without notice

FREE DELIVERY ANYWHERE IN AUSTRALIA

PRICES CRASH!

AFTER XMAS BARGAINS

YES WE WILL STILL BEAT ANY ADVERTISED PRICE BY $10*, AND DELIVER FREE!

EPSON 'Half Price' Printer package

EPSON LX86 or G x 80 Printer ideal for most computers. Real NLQ and 120 CPS in draft tractor/ friction feed. 12 months warranty.

Here is how it works:

Epson L x 86 Normally	$662
Box of paper	$26
Printer cable (of your choice)	$38
4 printer ribbons	$78
20 Dataland DSDD disks	$78
Total	$882
You Pay Only	$491

TEAC DISK DRIVES

Apple compatible	$218 inc
IBM compatible	$188 inc

The best Japanese Quality, buy now at these new low prices.

HOBBIEST POWER SUPPLIES

IBM 63 W	$69 inc
IBM 130 W	$198 inc
Apple	$98 inc

Everything IBM Phone Us Now

FAMOUS BRAND "IBM" COMPATIBLE

Colour Monitors

- Medium Resolution
- 16 Colours
- Text Switching
- RGB Colour
- Composite Green
- 14" Wide Style Screen

$499 inc

DATALAND-PC "BUY OF THE YEAR"

HI RES GREEN SCREEN INCLUDED

IBM compatible 20Mb hard disk 1 x FDD, Turbo PCB colour/mono/ graphics, printer ports — the lot. System software and more

$2660

FREE BONUS L x 86 NLQ, 10", 120 CPS Printer to the 1st 20 customers at no extra charge.

APPLE CARDS

We have almost every compatible card in stock.

$45 (inc)

JOYSTICKS

Any Apple	$39
IBM PC/XT	$49
IBM JX	$49
BBC (Pair)	$49
Commodore	$29

MODEMS

- Sendata 300/1200/75 super viatel modem, inc software and cable $280
- Nice 1200/1200 FD viatel, 1200 baud full duplex, every feature you could ask for inc software $680

ACORN COMPUTER SPECIALS

Acorn colour computer recommended by the Education Dept.
$199 (inc)

Plus 1 printer unit
$143 (inc)

Plus 3 disk unit
$393 (inc)

Software Galore from $8 each

BARGAINS

- Paradise Modular card was $799 now $499
- DEC Rainbow, hard disk, printer
- Hi res green screens TTL or composite $169
- Dataland IBM compatible computer one with the lot $1495
- KDS/ICL Terminals $495
- IBM BASIC compiler $199

BEST HARD DISK BUYS

The famous Seagate Kits, inc hard disk controller, cables, manual, nuts & bolts, software and manual.

20 Mb kit	$930 inc
30 Mb kit	$1130 inc

DISK VALUE

New Dataland diskettes life time warranty, plastic library boxes of 10. Get two boxes for just $38

Mail order now! Call direct! Call today! Shepparton (058) 21 7155

DataParts

The best computer people in the country.

bankcard

Available from these outlets–

CAMBERWELL: 519 Burke Road (03) 20 7895
BENDIGO: 419 Hargreaves Street (054) 43 4866
SHEPPARTON: 11 Edward Street (058) 21 7155

WOLUNDRY COMPUTERS: Wagga (069) 21 6466

CREDIT CARDS Phone sales accepted

Trade Enquiries Welcome

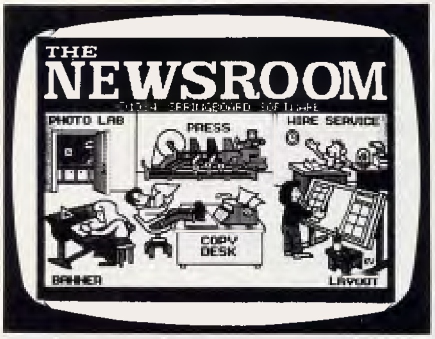
FREE DELIVERY ANYWHERE IN AUSTRALIA
CALL NOW AND SAVE!
YOU WON'T BEAT OUR QUALITY OR PRICES!

DATAPARTS
Fully authorised IBM dealers.
If you think these prices are competitive, wait until you see what we can do with IBM PC's and other IBM products. Don't buy any IBM gear until you talk to DataParts. We've got the works, from complete systems to the widest range of IBM software and compatible products.

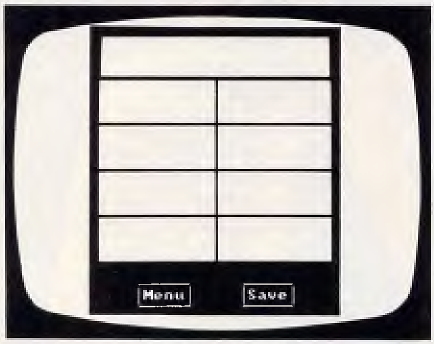
- *Prices advertised must be quoted*

**Prices subject to change without notice.* MFA DP PO49

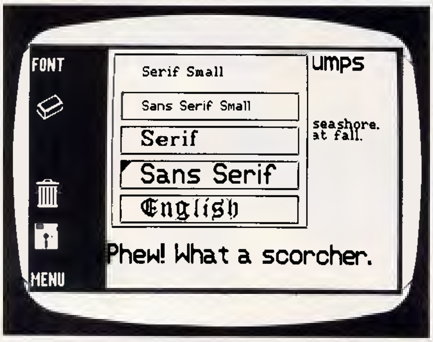
** For items over $100*



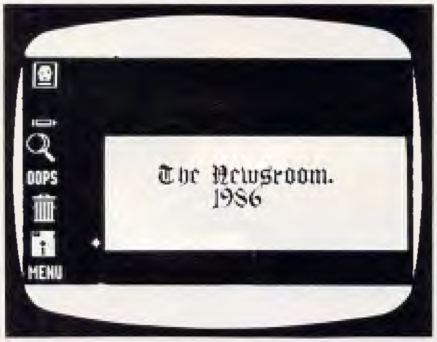
How can you take the Newsroom page-layout program seriously when the opening menu looks like this?



A page in Newsroom is made up of a number of panels and, optionally, a banner. This gives you very little control over the final layout



The selection of fonts in Newsroom is very limited and no extra fonts can be added. Only two font sizes can be selected



There is practically no difference between the layout of a banner and a panel. Text within a banner turns out larger than within a panel, and it is also possible to run text around graphics as a banner

The individual panels, banner and photo laboratory are designed on very similar screens, the only difference being that the panels have an additional simple text-editing facility. Anyone familiar with MacPaint or similar packages should be instantly at home with Newsroom — in fact, there is little to distinguish this screen from the current crop of 'art' packages.

Two screens are used in the design of banners, panels and photos. The first screen consists of a white area for the design and a graphics menu running down the left-hand side. Among the options from this menu are a switch to the second screen, magnify, load a picture from library, and disk storage. The second screen gives all the normal art package options such as brush pattern, fill pattern, lines, circles, squares, type fonts and type sizes. For a package pertaining to be a page-layout package it was pitiful to be able to use only three fonts or typefaces in two sizes. The three fonts are Serif, San Serif and Old English.

No facility is included to enter text from an ASCII or word processor file, so all the text has to be entered directly into the panels. Similarly, there is no option to create graphics on a third-party graphics package and load them in. There is a library of predefined pictures for use throughout the layout. Unfortunately these pictures are about as tacky as the main menu, consisting entirely of childish cartoons. The only exception are the map pictures which are of some use, but only feature maps of the States. To get the most out of drawing options, I strongly recommended the use of a mouse, joystick or touch-tablet.

After designing the banner and panels, all that remains is to put them together to form a page, and print them. The layout option on the main menu leads to a simple block representation of the panels that make up a page. Within each panel is a list of the files that could possibly be used to fill it. Selection of the file you want is once again done by the cursor keys and the ALT key.

Passed for press

Once a page has been defined in the layout area, you can then print it. Individual banners, photos and panels can also be printed. A variety of printers are supported with Newsroom, but not one of them is a laser printer.

I had planned to layout an *APC* Checkout as a test of the package's power; within five minutes of using Newsroom, however, I became aware that it was not up to the task.

Comms facility

The last option I looked at on the main menu was the one labelled 'Wire Service' — the communications facility. After the disappointment of the previous five options, I was hopping Newsroom might redeem itself with this option.

The idea of a simple comms package linked into a desktop publishing package is one I like, and I immediately began to conjure up visions of copy being sent straight into the newsroom. But no, Newsroom is as weak here as it is throughout the rest of the package. All this option lets you achieve is the transmission of a panel, banner or page to another Newsroom owner, provided both have Hayes-compatible modems.

Documentation

The manual that comes with Newsroom is an 85-page, A5 booklet which is written in patronising American 'Isn't this amazing!' style. The first 40 pages are an explanation of how the package works and are adequate for the purpose. The remaining 45 pages are modestly titled 'The complete guide to creating a newspaper' and cover among many topics, interview technique, advertising, editing, proofreading and creating headlines. Again, very patronising.

There is also a 160-page version of the manual available for use at schools.

Also available are three extra disks of Clip Art. Clip Art 1 sells for $50.97 and includes 600 graphics pieces on a general theme; while Clip Art 2 has 800 graphics pieces related to the business/office environment and costs $62.31. Clip-Art 3 is based on sports and recreation and has 500 graphics pieces, and retails for $62.31.

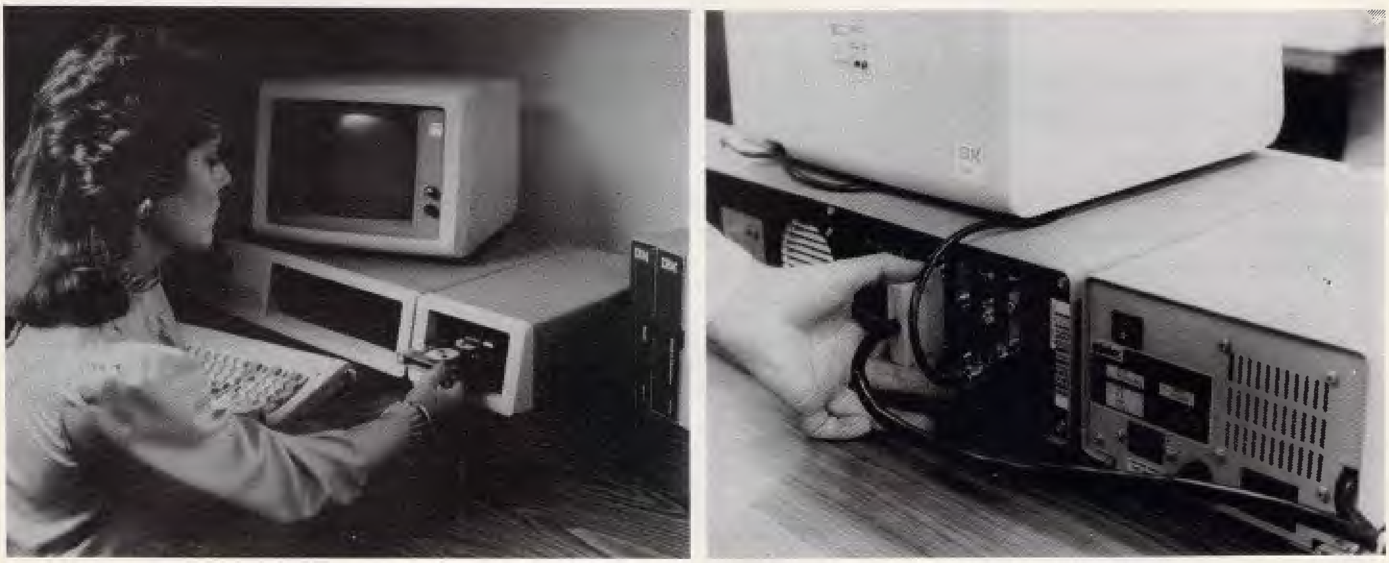
Newsroom Pro has also been released and is designed for a 512k IBM PC, and also includes Clip Art 1 and 2. Newsroom Pro will support laser printers and costs $289.96.

Fleet Street Editor

Fleet Street Editor runs on an IBM PC or compatible with at least 512k of RAM, either a CGA colour card and monitor or a Hercules graphics card and monitor, two floppy disk drives or one floppy and a hard disk, and one of a number of printers. If you want to run Fleet Street Editor with one of the popular laser printers, such as the HP Laser Jet the HP Laser Jet Plus or the Canon Laser, you will need to purchase an additional Laser option disk. Two mice are supported with Fleet Street Editor: the Microsoft mouse and the Mouse Systems mouse. For both of these you will need the appropriate mouse-driver software, as

What is the easiest way to back-up and transfer data between

IBM-XT-AT PC, Olivetti PC, NEC APCIII & IV, Sperry PC, Compaq PC, T.I. PC, H.P. Vectra, N.C.R., Ericsson, Kaypro, etc, etc, etc*?



It's as easy as plug-in, back-up with a Cipher 5210 Floppytape.

- Cipher 5210 allows back-up and restore under ***NOVELL***
- Back-up and Restore without operator intervention
- 5210 will back-up 25Mb of formatted data on a single cartridge or any size DOS disk on multiple cartridges
- File orientated back-up
- Selectively archive data from hard disk
- Reliable data integrity
- Easy file management functions
- Eliminates data transfer problems between different hard disks having dissimilar bad-sector maps

****Contact your nearest computer dealer or Elmeasco for more information.***

ELMEASCO
Instruments Pty. Ltd.

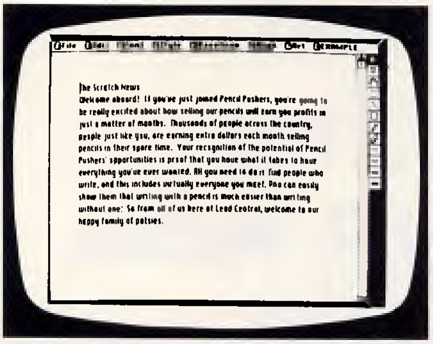
NEW SOUTH WALES
15 McDonald Street,
MORTLAKE
P.O. Box 30, CONCORD
NSW 2137
Tel: (02) 736 2888
Telex: AA25887

VICTORIA
12 Maroondah Highway,
RINGWOOD
P.O. Box 623, RINGWOOD
VIC 3134
Tel: (03) 879 2322
Telex: AA30418 ELTENT

QUEENSLAND
Tel: (07) 875 1444

S. AUSTRALIA
Tel: (08) 344 9000

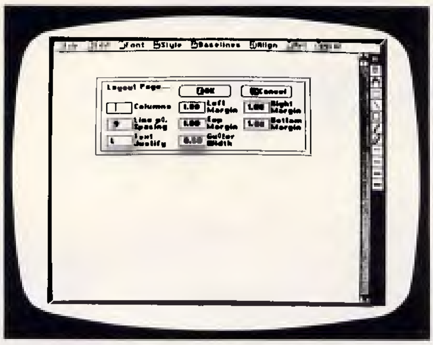
W. AUSTRALIA
Tel: (09) 481 1500



The Scratch News

Welcome aboard! If you've just joined Pencil Pushers, you're going to be really excited about how selling our pencils will earn you profits in just a matter of months. Thousands of people across the country, people just like you, are earning extra dollars each month selling pencils in their spare time. Your recognition of the potential of Pencil Pushers' opportunities is proof that you have what it takes to have everything you've ever wanted. All you need to do is find people who write, and this includes virtually everyone you meet. You can easily show them that writing with a pencil is much easier than writing without one. So from all of us here at Lead Central, welcome to our happy family of potsies.

The main Fleet Street Editor layout screen has been heavily influenced by the Apple Macintosh



Layout Page

Columns 1

Left Margin 1.00

Right Margin 1.00

Line pt. Spacing 9

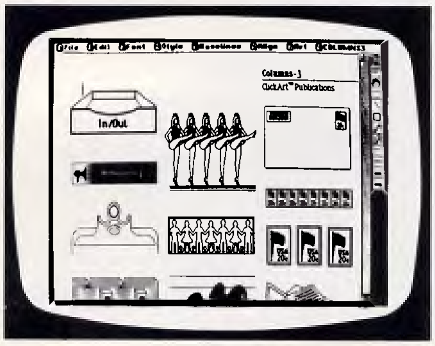
Top Margin 1.00

Bottom Margin 1.00

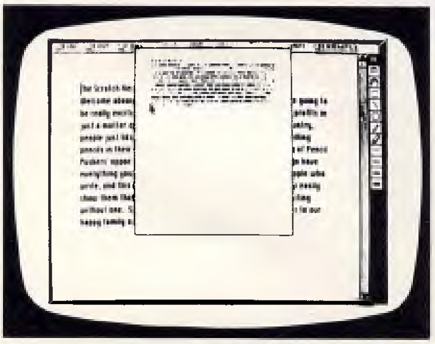
Text Justify L

Gutter Width 0.50

Detailed control over page layout can be achieved by use of the page layout dialogue box



An extensive collection of illustrations is included with Fleet Street Editor to 'cut out' and add to your own documents



An onscreen view of the entire page can be obtained by selecting 'View whole page' from the Edit menu. Although this is not readable it gives an impression of how the printed page will look

none is supplied with the package.

Design

The system supplied for review was actually a pre-release version, so there was no packaging and the manual was a photocopy of the proofs. The system was supplied on four disks — two systems disks (one for a Hercules set-up and one for a CGA), a fonts disk and a graphics library disk. The system disks contain the Fleet Street Editor code, which at 300k is a hefty object code file.

Fleet Street Editor is not copy-protected, so installing it on hard disk is just a matter of copying the files across to a suitable subdirectory. Running it is then simply a case of typing 'FSE' as the MS-DOS prompt.

When Fleet Street Editor has loaded, you are faced with a screen which is extremely similar to that of the Apple Macintosh. A blank desktop occupies most of the screen and a pull-down menu bar runs across the top with the options File, Edit, Font, Style, Baselines, Align, Art and New. Each of these options also has a corresponding function key marked alongside to allow you to use the package without a mouse. Running down the right of the screen is a second graphics menu of all the common art tools. If a mouse is plugged in, two cursors will be on the screen — the text cursor and the mouse pointer. With no mouse, only the text cursor will be visible. All the Fleet Street Editor controls are driven from this screen. To save space I will assume a knowledge of the controls used in a WIMP/Macintosh environment; many articles have been publised in *APC* using such an environment. Needless to say, the similarity between Fleet Street Editor and the Macintosh makes a mouse very desirable.

Page layout

To start a new layout, you simply select 'New' from the 'File' menu. The first thing to do when laying out a page with Fleet Street Editor is to decide how many columns the page is to have: *APC*, for example, uses three or four-column grids. With Fleet Street Editor you can use between zero (that is, the whole page and eight columns. Fleet Street Editor then displays appropriate column guides at the bottom of the screen. If you decide you want a special column layout with unequal column widths, you can pick up one of these guides and drag it to where you want.

One of the great advantages the Macintosh Pagemaker package has over its rivals is that it can accept both text and graphics from other Macintosh packages. Fleet Street Editor goes some way to achieving this as it can accept text from any word processor that can produce an ASCII file, and Mirrorsoft is planning to launch a package for the creation of detailed artwork. There is no standard format for graphics on the IBM PC, so this is really the best you could expect. A library of existing pictures which comprises such things as maps, borders and lots of miscellaneous illustrations is included.

When text is brought into Fleet Street Editor, it takes a standard font and point size known as Geneva 14pt. To change this, you select 'Style' from the top menu and then choose one of the 10 fonts from the menu in one of eight point sizes. The complete list of fonts is: Athens, Chicago, Geneva, London, Los Angeles, Monaco, New York, Seattle, Toronto and Venice. The point sizes are 9, 10, 12, 14, 18, 24, 36, and 48. This should be sufficient for most internal reports, but is nothing compared with the variety of fonts and point sizes available from professional typesetters.

You can also set a number of attributes of the text such as bold, underline, superscript, and so on. Leading, the space between lines, can be set in multiples of one point.

When you have placed a block of text, there are a number of things you can do with it. You can move it around — this is done by selecting the arrow-shaped pointed in the toolbox, clicking the block and dragging it around the screen, or whatever you will.

You can also change the length of the block. This is the most useful of all the features: for example, you might layout text the length of a whole column, from the top to the bottom of a page, and then decide that you want a picture at the bottom of the column. To do this you need to make a space, so you simply select the end-of-block marker and move it up the column until you have enough space for the picture. The extra text will automatically be moved to the next column and the space will be made.

Finally, you can change the appearance of a block of text. To do this, you select the 'Edit' icon (capital A) from the toolbox. You can then edit as though you were using a Macintosh type of word processor — you can delete words, add extra text, and so on.

The normal display for page layout shows about one third of an A4 page. To get a view of the whole page you can 'zoom out'; in theory you could work on this screen, but I found it disturbing not being able to read the text. Similarly, you can 'zoom in' for more detailed work.

Laying out graphics is achieved in much

279 Victoria St
W/Melbourne
Phone 329 2555
Alternative Number
363 2243

MicroDOS
Computers Australia
IMPORTERS & DISTRIBUTORS

Shop 3
Belcher Arcade
173 Moorabool St
Geelong
Phone 052 21 8857

Specialists in Systems for Business, Office, Schools and Home
***** All Systems with 12 Month Warranty *****
***** All Japanese Components *****

MicroDOS 640K PC/XT (System 1)

- 640K RAM on Motherboard
- 8088 Processor (V20-5 optional)
- 2 x 360K Double Sided NAT Drives
- AT Style Keyboard
- Full Features — eg
  Provision for 8087 Processor
  8 Expansion Slots
  Parallel and Serial and Games Ports
  Real Time Clock, Calendar and Battery
  150-180 W Power Supply

- **Monitor on Swivel Base Composite included**

$1345

MicroDOS 640 PC/XT TURBO

SYSTEM 2 AS ABOVE INCL MONITOR

$1445

Interface for IBM or compatibles

Multifunction Card 384K	$299
Multi 10 Card	$189
Cable for above	$14
Hard Disk Controller	$289
IBM Disk Drive	$199
Printer Cable	$23
Replacement Keyboard	$139
Replacement Keyboard AT Type	$199
Mouse for PC with Software (optical)	$110
Suitable for Lotus 1-2-3, WordStar etc.	
Copycard with Software	$149
Extended Graphic Card	$449
Colour Graphic Card	$199
5¼ Disk Stor	$22.99

HARD DISKS

20 meg	$899
30 meg	$1199

INCL. CARD

SPECIAL ORIGINAL 3.1 DOS $89

MicroDOS
1 MEG PC/XT (SYSTEM 3)
(DELUXE TURBO)
INCL MONITOR

$1750

BONDWELL BW8

CAP PORTABLE
MS DOS 2.11
ONLY 4.5 KG COMPLETE
WITH 720 K DISK DRIVE
BACKLIT LCD SCREEN AND
BATTERIES ONLY

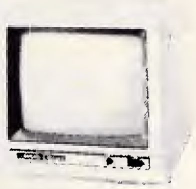
$1999 incl. Tax

ALL WARRANTIES ARE COVERED BY OUR OWN LARGE REPAIR SHOP OR AUTHORISED AGENT
EST OVER 14 YEARS
MAIL ORDER NOW!
CALL DIRECT! CALL DIRECT!
***DELIVERY AUSTRALIA WIDE**
DEALER ENQUIRIES WELCOME.
FRANCHISE AVAILABLE
S.A. & N.S.W.
B/C M/C ACCEPTED
ALL PRICES INCLUDE SALES TAX

New Product

"Funmouse"
* Mouse Emulation
* Cursor Control
* Arcade Quality Joystick

Only $129



MONITORS GALORE

BEAT THESE FOR PRICES

Composit Amber or TTL Green	$189
Colour Monitors (Thomson)	$599
OTHERS	$ Call

Printers Galore

LX 86 Incl. Tractor Feed	$489
Super 5 EP1201	$479
Other	$ Call

Interface for Apple IIe

Apple Compatible Cards for IIe

128 K Ram Card	$129
280 Card	$89
Super Serial Card	$99
Clock Card	$99
Talk Card	$59
Controller Card	$89
Printer Card	$79
Disk Drives	$199

REFERENCE MANUALS GALORE — WE STOCK A HUGE VARIETY

OUR MOTTO "FOR QUALITY, RELIABILITY AND 1ST CLASS SERVICE"
— THINK MicroDOS

the same way as laying-out text, only first you must 'crop' the picture to fit the space allocated. 'Cropping' is the process of trimming the edges off a picture. Having cropped the picture, you then create a .ART file to contain it. This is then pasted into the page. Having to crop a picture before dropping it into the copy is a little awkward, but the problem can be alleviated by calling up an on screen ruler during the whole operation. Rulers can be activated at any time and you can choose the scale from inches, millimetres, picas or points. The current position of the mouse cursor is displayed on these rulers so you can use them very accurately.

A number of useful drawing facilities are available to use directly on the page layout, including lines to separate text, boxes to highlight both text and pictures, ovals, and so on. The only option I particularly missed in this area was the ability to shade a box, a very effective way to emphasise an area of text on a page.

Passed for press

I used Fleet Street Editor with both a standard Epson FX-80 and a Hewlett-Packard Laser Jet Plus. Althought the output on the Epson was surpringly good by dot-matrix standards, there was absolutely no comparison with the output from the Laser Jet. The manual suggests that a dot-matrix printer could be used for drafts, but considering that the dot-matrix takes almost 10 minutes to print out the page compared with the Laser Jet's 15 seconds, I can't really see the viability of this. The output from Laser Jet Plus is superb, and approaches the quality of a professional typesetters. Certainly for documents such as company reports, reviews, and so on, it is excellent.

Fleet Street Editor was well up to the task of laying out a *APC* Checkout. The results were not that inspiring, although this was due to my lack of skills as a layout artist rather than any deficiencies of the package.

Documentation

I was only supplied with a photocopy of the pre-production manual, but it looked very good. Like the Newsroom manual, it is split into two sections: the first section tells you how to operate the package, while the second tells you how to design a page of text. Unlike Newsroom however, the Fleet Street Editor manual is far more helpful on such things as constructive use of white space and how to present text for maximum effect. The manual seems generally well-written, and no doubt when Mirrorsoft gets round to putting in the illustrations, it will be well-illustrated.

It is a tribute to the ease of the Mac-like user interface that I used the package for almost a week before needing to refer to the manual.

Conclusion

Pagemaker on the Apple Macintosh was a hard act to follow, and I had severe reservations as to whether the IBM PC could ever do anything similar. No desktop publishing package I've seen at any price on the IBM has rivalled Pagemaker on the Macintosh, and that includes both Newsroom and Fleet Street Editor.

However, Fleet Street Editor is capable of producing high-quality reports and it does cost a third of similar IBM PC packages. If you've already committed yourself to IBM hardware and a suitable laser printer, I suggest you take a good look at Fleet Street Editor before laying out money on a more expensive package.

On the other hand, Newsroom is no more than an art package, and not even a very good one at that. Newsroom Pro, however, is probably the one to go for.

Fleet Street Editor is available from ISD on (03) 222 2288 for $599. Newsroom is available from Dataflow on (02) 331 6153 for $102.

END

YOU TOO COULD BECOME A NEWSPAPER TYCOON!

FLEET STREET
CITY OF LONDON EC4
Editor

The world of personal publishing on your IBM PC for $599.00

Fleet Street Editor brings desktop publishing to your IBM PC or 100% compatible. Now you, too, have a professional, low-cost alternative to expensive and time-consuming typesetting and paste-up services.

Use it to create:
- Multi-column newsletters and publications
- Advertising layouts and brochures
- Business reports and contracts
- Promotional literature and specification sheets
- Flyers and overhead transparencies
- Organisation charts and flow charts
- Invitations and announcements
- Menus, cards, letterheads, and much more

Fleet Street Editor is flexible, yet very easy to use. Working on a what-you-see-is-what-you-get principle, designing page layouts that work becomes almost automatic, with true-to-scale fonts and images displayed on the screen.

Text processing features:
- Insert text directly or read it in from any ASCII word processing file
- Cut, copy, and paste
- Insert and delete
- Ten different fonts in varying sizes and styles

Page layout features:
- Left, right, centre or full-out justification
- Automatic word- and picture-wrap
- Vertical and horizontal rules
- 1, 2, 3, or 4 columns
- Variable column widths – even within a column
- Individual positioning of baselines

Drawing tools
- Straight line rule in four widths
- Variable-size box in four line widths
- Freehand pencil
- Eraser
- Flip, invert, reverse or duplicate image
- A complete library of ready-to-use 'click-art' images
- Snapshot facility to import graphics screens from other software packages

Optional Extras
- Extra click-art libraries of graphics
- Additional font disks
- Laser printer drivers for HP LaserJet or Apple LaserWriter

System Requirements
IBM PC, AT, XT or compatible
Two floppy drives or one floppy drive and a hard disk
512K RAM
IBM Colour Card, Hercules Graphics Card, EGA (in colour card mode)
Dot matrix printer supporting IBM graphics

Optional
Microsoft Mouse, Mouse Systems House, Logitech Mouse or compatibles

Distributed by
ISD ®

DEALER ENQUIRIES WELCOME
(03) 222 2288
34-36 Wadhurst Drive, Knoxfield 3180
Fleet Street Editor is a registered trade mark of Mirrorsoft Ltd.

Write a letter with just 5 key-strokes

Lewis LETTER MAGIC

Lewis LETTER MAGIC dramatically reduces your time and effort in producing letters, labels, reports, simple invoices, etc. Easy to master as it only includes those commands needed to write letters. More than just a word processor, LETTER MAGIC includes a powerful database. Lets you merge individual details into bulk mailings.

Ideal for sales, customer maintenance, clubs and any office that writes letters. $454.00 incl. tax.

Dr Geoffrey Lewis
"LETTER MAGIC is my most innovative product. With LETTER MAGIC I have automated the production of letters."

Lewis CROSS-CHEQUE

Lewis CROSS-CHEQUE helps you keep better track of your accounts (and your business) by doing all your cashbook work for you. Lets you prepare a detailed report for your accountant.

Ideal for businesses not needing general ledger accounting, such as doctors, shops, farmers. Over 300 users already. $318.00 incl. tax.

Lewis PAY-PACK

PAY-PACK lets you pay your staff using your own computer. Produces pay slips, group certificates, cash break-ups, reports, etc. Now being used by over 250 employers. $786.00.

Demo Kits — Each comprises the manual and a disk allowing you to test all aspects on your own computer. Your payment can be credited to your purchase. Available for most MSDOS & CPM80.

Send coupon to:
Custom-Made Software Pty Ltd
P.O. Box 507, Randwick, NSW 2031
Tel: (02) 399 8566

	Letter Magic	Cross-Cheque	Pay-Pack
Send more info.	☐	☐	☐
Send demo kit (cheque enclosed)	$36 ☐	$36 ☐	$60 ☐
Send full system	☐	☐	☐

Name: ....

Address: ....

....

Phone: .... Computer: ....

LOGITECH

STOP PRESS! BUS VERSION NOW AVAILABLE

LOGIMOUSE C7

Don't tolerate inferior pointing devices!

A brilliant match of ruggedness and sophistication ensure the Logimouse C7 is the pointing device of choice for PC/XT/AT & compatibles.

— Easy to set up
— High resolution
— Comfortable to use
— Superb action
— No pads, power supplies etc required

Useful support software means you get to enjoy Logimouse with all your favorite applications quickly, easily:

BASE PACK **$185**
— Flexible, industry standard driver
— Interface software for programmers

PLUS PACK **$205**
— Click: Automatic mouse configuration
— Point Editor: windows, menus, etc
— Point & Click Shell: for Lotus 123
— Logimenu: For applications that don't yet know about mouses

LOGIPAINT PLUS **$285**
— PC Paintbrush with Plus Pack

LOGICADD **$315**
— Generic CAD with Plus Pack
— Ideal entry for CAD draughting

REFLEX with PLUS PACK **$329**

— Database made easy with mouse

LOGITECH

MODULA-2/86

For the serious programmer who needs to break out of the 64K barrier, wants code others can read and share in a team programming environment, Logitech's MODULA-2/86 is the answer.

Prices start at an incredible $159 for the Base Language System. A Turbo Pascal Translator and a broad range of support/debug software is also available.

Why wait any longer? Call NOW for more details.

bje

Prices exclude Sales Tax

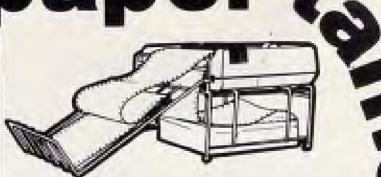
Logitech Authorised Distributor

Dealer Inquiries always Welcome

B.J.E. Enterprises
(02) 858 611

35 West Parade
Eastwood 2122

paper tamer



Printer Stands

COLLECTS PRINTOUT

Available from Dealers Australia Wide

CPN **COMPUTER PRODUCTS NETWORK**
39 Dickson Ave.,
Artarmon 2064
Tel: (02) 439 8966

Innovative Suppliers to the Australian Computer Industry

a 011

TOSHIBA

PORTABLE COMPUTERS

T3100-AT
T2100-XT
T1100+ & T1100-PC
24 PIN PRINTERS
FROM $9500

AVAILABLE FROM

K & C INFOCOM P/L

10-4.30 MON-FRI

212 3096 211 1020

What could be better than an

IBM AT FOR $1,690

An **ULTRA AT** of course

- 80286 CPU 6MHz and 8MHz switchable
- 512K RAM
- Japanese quality boards
- 1.2MB floppy disk drive
- Parallel port, serial port
- Color graphics adapter
- 8 expansion slots (6 AT, 2 PC)
- 200W power supply
- 84 key AT style keyboard
- Large range of bundled software
- 12 months parts and labour warranty

The lowest price for the best AT
$1690 ex, $1990 inc.

ULTRA XT

- 8088-2 CPU 6MHz and 8MHz switchable
- 640K RAM on motherboard (exp. to 1MB)
- 2 x 360K disk drives
- All boards and drives Japanese
- Parallel, games and 2 serial (1 imp.) ports
- Color or mono (Hercules compatible) graphics card
- Large range of bundled software
- 12 months parts and labour warranty
- Too many other specs to list in this ad

Incredible value for money
$1169 ex, $1340 inc.

ULTRA V-20

- NEC V-20 CPU performance that outstrips any mere turbo
- All other specs as ULTRA XT

Unrivalled power, unbeatable price
$1209 ex, $1380 inc.

20MB top brand hard disk and controller.
12 months warranty. With computer
$730 ex, $850 inc.

Write for catalogue to:

LYSCO

P.O. Box 265
Bunbury. W.A. 6230

or phone
Ph (097) 26 3009

Prices subject to fluctuation
DEALER ENQUIRIES WELCOME

CARTEL PERSONAL COMPUTERS

823 GLENHUNTLY ROAD,
CAULFIELD SOUTH, VIC. 3162
PHONE: 523 0006

OPENING SPECIAL

IBM PC/XT
(THE REAL THING)

- * 640K RAM Memory
- * 1 x 360K Floppy Drive
- * 10 Meg Hard Disk Drive
- * Color or Mono Video Output
- * Serial Port
- * Parallel Port

$2780

CPC/XT/ PORTABLE

- * 640K — Turbo
- * 2 Floppy Drives
- * Dual Monitor
- * Serial/Parallel Port
- * 9" Monitor

$1950

DISKETTES XIDEX

CHRISTMAS SPECIAL

5¼" SS/DD $27.80/BOX
5¼" DS/DD $35.00/BOX
5¼" HD-AT $68.00/BOX
3½" SS/DD $50.70/BOX
3½" DS/DD $57.00/BOX

FREE — Coleman 6 Pack Cooler with purchase of 5 boxes of XIDEX-branded Diskettes

*Nashua 5¼" DS/DD $30/Box
*Precission 5¼" DS/DD $20 per 10

MONITORS

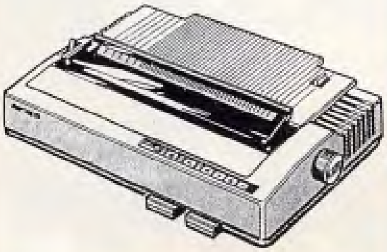
THOMSON TTL	**$260**
SAMSUNG TTL	**$220**
THOMSON 14" COLOR	**$595**
THOMSON COMPOSITE	**$240**

INTERFACE FOR IBM AND COMPATIBLES

360K DISK DRIVE	**$185**
5 MEG HARD DRIVE & CONT.	**$465**
20 MEG HARD DRIVE & CONT.	**$940**
HARD DRIVE CONTROLLER CARD	**$296**
LINK TERMINAL	**$660**
HERCULES COLOR CARD	**$295**
PERSYST COLORGRAPHICS CARD	**$168**
PERSYST MONO CARD	**$168**
STB SHAUFFER CARD	**$287**
* APPLE TYPE JOYSTICK	**$25**

STAR PRINTERS

SD15-160CPS	**$785**
SG15-120CPS	**$650**
NX10	**CALL**
NX15	**CALL**
NB15	**CALL**



CPC/AT COMPATIBLE

- 80286-2 Main Processor (optional 80286-7 co-processor)
- 1024K RAM
- 1 x 1.2 Meg Floppy
- 1 x 20 Meg Hard Disk
- 200 Watt Power Supply
- Keyboard Lock
- Color or Monochrome Output

$3450

CPC/XT COMPATIBLE

- 640K RAM Memory
- 8088 Processor
- Provision for 8087 Co-Processor
- 8 Expansion Slots
- 2 360K Double Sided Disk Drives
- Centronics Parallel and Serial Ports
- Real Time Clock Calendar, Battery Back-Up

$1195

- Monitor Not Included
- Turbo CPC/XT — as above $1295

ALL PRICES INCLUDE SALES TAX

PAS

MODULAR FILING SYSTEMS
ACOUSTIC HOODS
ERGONOMIC COMPUTER FURNITURE

*IBM IS A REGISTERED TRADEMARK OF INTERNATIONAL BUSINESS MACHINES

A future vision

The final part of Mike Jame's data structures series looks at the evolving nature of programming and how programming languages, as we know them today, must eventually become extinct.

This is the final part of a six-part, series on programming methods and the creation of programs. Parts one to five appeared in the July to December issues except September respectively, copies of which are available from the Back Issues department.

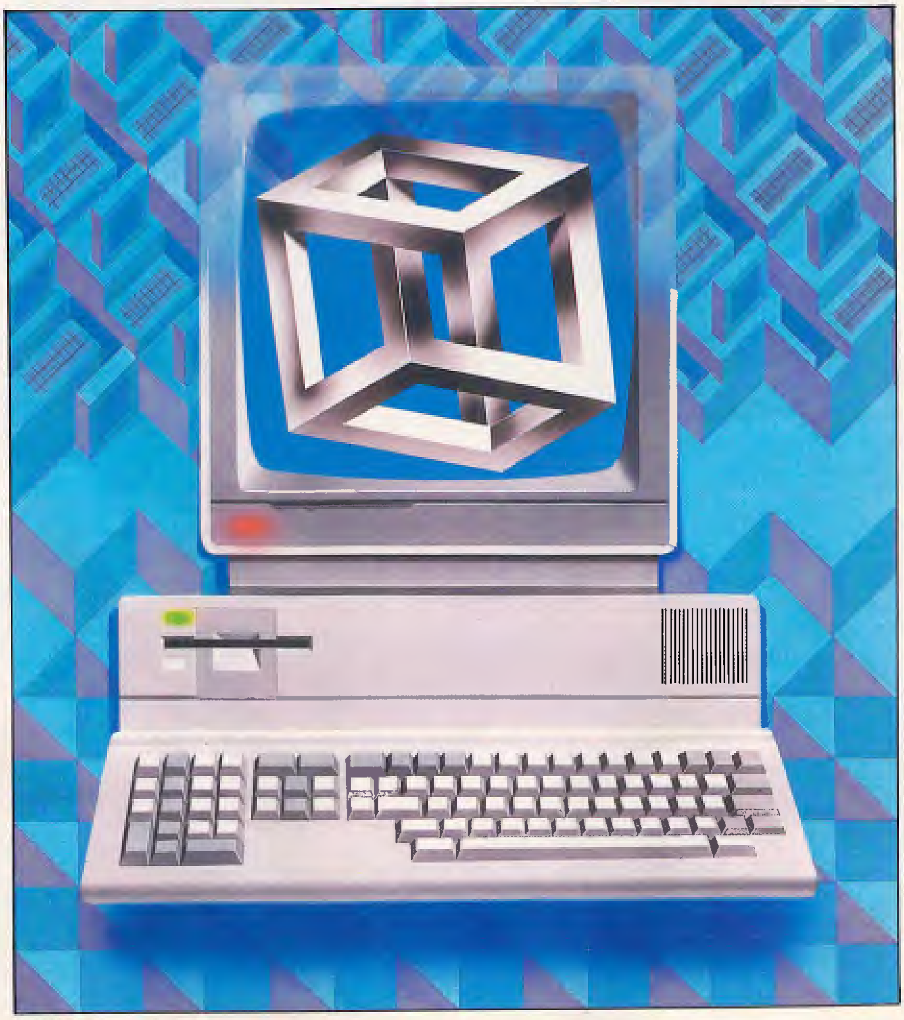
Looking into the far future is an easy occupation, as is any pronouncement on the unknowable. A more risky venture is looking for the seeds of tomorrow's commonplace among today's new ideas. When it comes to programming, 'risky' is something of an understatement. Who would have guessed 10 years ago that Basic would not only be still in use but the first language on most computers. On the other hand, the fact that Fortran, the first high-level language, is still important should warn against making predictions of rapid change! In fact, change is even slower than you might imagine because even though different languages have been introduced over the years, we still program in exactly the same way we did using the first assembly language. What is important for the future is not which language we code our ideas in, but the type of ideas that are natural and easy to express in a programming environment.

Most developments in programming take the form of improvements to existing languages or methods. As Fortran was an improvement on assembly language, so Basic derived from Fortran, Pascal from Algol, and so on. You could see some of these changes as being important new revolutionary steps — Fortran was the first high-level language and introduced the idea of translating one line of a program into perhaps many lines of machine code. Algol introduced structured control statements that took us yet another step away from assembly language and machine code, and so on — but they are all developments of procedural languages.

In the current view a program is a list of instructions concerning what should be done with a number of objects, usually referred to as the data, and a programmer's job is to create such a list of instructions and appropriate data types to solve a given problem. If you start from this point of view, then you will slowly construct the whole of computing as we know it today.

The only real progress since the days of machine code and assembly language has been the gradual move away from the shortcomings and idiosyncrasies of the underlying hardware. In other words, computer languages are becoming more and more machine independent and abstract. (Surprisingly, although most programmers would agree that machine independence is a worthwhile advance, it is still a widely held belief that efficiency of implementation is something that languages should take into account — efficiency of implementation is about hardware.)

You might think that machine indepen-



dence and abstraction were relatively easy goals — just forget about the machine and create a pure language. In practice, it is almost impossible to forget the underlying machine — anyone who knows enough about computing to be able to design a language also knows too much about computers to ignore the hardware. Even one of the most up-to-date languages, Ada, contains a new programming construct, the exception (see part four, 'Righting wrongs', November 1986). Although this appears to be abstract and machine independent, it is in fact nothing more than a high-level language version of a hardware idea called a 'trap'. This isn't to say that a language construct that is close to the hardware is necessarily wrong, it's just that the hardware remains the starting point and only time will tell if the construct will evolve away from this position.

New approaches

There are two new approaches to programming that seem to be trying to break away from the confines of the hardware-based model — logic (or declarative-programming) and object-orientated programming. The first of these approaches is typified by the language Prolog and the second by the programming environment Smalltalk. Although these will be used as examples, it is important to separate criticisms of these particular products from any difficulties of the methods and philosophies that they represent. In other words, although you may like Prolog, this doesn't necessarily make all declarative languages a waste of time.

It has often been said in the past that the trouble with our programming methods is that they concentrate too much on describing *how* to do something rather than on describing *what* should be done. Until recently the only example of the 'what rather than how' principle would have involved appeals to the yet unfulfilled promise of artificial intelligence research. In the future computers might be able to take descriptions in English of what is required and generate their own programs to satisfy our requirements (after all it's *what* we do, isn't it?) but at the moment such machines are science fiction.

The first real practical approach to the 'what' style of programming can be found in declarative languages, and Prolog in particular. In a declarative language the programmer makes a lot of statements that summarise what is known and then a statement that is either in doubt or incomplete, and the system then checks its validity or completes the statement. Obviously if we allow the type of statement to be of arbitrary complexity, we need nothing less than an intelligent machine to work out the answer. In practice, some restrictions are required on the language used to express the statements of what we know. In Prolog, the language is essentially classical predicate logic, in which statements are either true or false.

As an example of the difference between declarative languages and traditional procedural languages, consider the simple problem of adding two numbers together. In a procedural language you would write something like:

```
X=2+5
```

which means take 2, add it to 5, and then store the result in the variable X. You can tell from the English description of what is going on that this single statement is a recipe for doing something.

By contrast the Prolog equivalent is almost tranquil! Prolog has access to an infinite number of predicates like (SUM123) which is a statement that (SUM 1 2 3) is true. Prolog doesn't have any understanding of this statement, but we humans find it quite natural to read it as '1+2=3 is true' and the Prolog has access to a similar predicate for every correct addition of two numbers. If you type in SUM 1 2 3 to Prolog, then it checks its store of knowledge to find out if the addition is true (correct) or not. If it is, then it is accepted; if it isn't, then Prolog will let you know. (In more complicated examples Prolog can reject a statement either because it is false or because it doesn't know enough about the subject to prove it true.)

This testing of arithmetic statements for truth or falsity is interesting but this is a silly way to work out, say, 10+45. You could do it by trial and error, typing impossible answers until Prolog accepts the correct answer but, fortunately, there is an easier way. If you type in

```
SUM 10 45 X
```

Prolog will search for a value of X that makes the predicate true. Now although this looks like the usual procedural way of adding two numbers together, all the activity is hidden in the machine and not in the program. This idea of Prolog searching for a value of a variable to make a predicate true is completely general. For example:

```
SUM 2 Y 3
```

will find a value, an instantation of the variable Y, that makes the predicate true — that is, 1 — and this is clearly the Prolog way of subtraction!

The above example of addition and subtraction is a good one because it is simple and familiar, but it is bad from the point of view of showing Prolog doing what comes naturally. In this case Prolog doesn't really have an infinite set of predicates telling it all about the truth of arithmetic — it uses a computational algorithm just like any ordinary language; but there is nothing wrong with the occasional computational predicate. A better example from the point of view of simple but more typical Prolog is the 'A is connected to B' type of problem. If you enter the predicates

```
(Connected Sydney Melbourne)
(Connected Melbourne Adelaide)
(Connected Perth Darwin)
```

which are clearly meant to summarise the way towns are connected without the need for a sea crossing. Then entering the predicate

```
Connected Sydney X
```

would cause Prolog to find a value of X that made the predicate true — that is, Melbourne. If you also add a predicate which lets Prolog know that 'X connected to Y and Y connected to Z implies that X is connected to Z' then it will also let you know that Sydney is connected to Adelaide, and so on. In other words, Prolog is capable of making deductions based on its store of knowledge to either discover that something is true or to find values of unspecified variables. It is this power of deduction that makes it possible for the Prolog programmer to ignore the problem of how something is to be achieved and concentrate on specifying the problem and asking the appropriate questions.

After this brief description you are either impressed by the potential of Prolog or feel that it is a fuss about nothing. I suspect that what you think depends on whether or not you have a suitable problem in mind. The question of what sort of applications Prolog is good at is something to which a lot of people would like to know the answer. All I can say is that a lot of people think that Prolog is worth trying and there are good reports about its performance from simulation to artificial intelligence.

Declarative programming seeks to replace the procedural imperative by automatic methods of deriving results. An alternative approach is to place more emphasis on the role of data in the construction of a program. The object-orientated method achieves this by making it explicit that the purpose of a program is to model reality.

The best-known example of an object-orientated programming language is Smalltalk but referring to Smalltalk as a programming language is considerably underrating what it offers. Smalltalk is a programming environment. You don't so much write a program using Smalltalk, rather you add your contribution to the Smalltalk system. The difference between a traditional procedure and a Smalltalk

Answer to creative challenge 5

The iterative solution to the Towers of Hanoi problem given below was inspired by the thought that if the monks of Hanoi were busy moving disks from peg to peg, it was unlikely that they were running a recursive algorithm. (Human thought may be generated by recursive processes, but most humans have great difficulty in following a recursive list of instructions without making mistakes.) After playing with three different-sized plastic cups, I formulated the following heuristics:

(1) Do not consider moving the disk that you have just moved; and

(2) If there is a choice of legal moves, always make a move to a peg closest to the destination peg.

The program given here implements these heuristics and they work. (The array T(I) is used to record the position of the top of the stack on peg I.) A little more investigation quickly shows that almost any replacement for rule 2 that avoids infinite loops of moves solves the Towers of Hanoi problem; in fact, I have a feeling that any heuristic that avoids infinite loops will solve the problem. Thus the Towers of Hanoi problem that initially looks complex and in need of a recursive solution is so constrained that as long as moves are making progress, a solution is inevitable.

There is one advantage to the recursive solution in that it is easy to prove that it is correct for all N. I have demonstrated that the iterative solution works for reasonable values of N, but so far I haven't (mainly because of laziness) proved that it works for all N.

```
 10 INPUT "number of disks ";N
 20 DIM PEG(3,N),T(3)
 30 GOSUB 1000:REM initialise
 40 REM make moves loop
 50  GOSUB 2000:REM print towers
 60  GOSUB 3000:REM find move
 70 IF HALT=TRUE THEN GOTO 100
 80  GOSUB 4000:REM do move
 90 GOTO 40
100 PRINT "finished"
110 STOP

1000 REM initialise
1010 FOR I=1 TO N
1020  PEG(1,I)=N-I+1
1030 NEXT I
1040 FOR I=1 TO 3
1050  PEG(I,0)=999
1060  T(I)=0
1070 NEXT I
1080 T(1)=N
1090 TRUE=1=1
1100 FALSE=NOT TRUE
1110 HALT=FALSE
1999 RETURN

2000 REM print towers
2010 FOR J=N TO 1 STEP -1
2020  FOR I=1 TO 3
2030   IF PEG(I,J)=0 THEN PRINT ".", ELSE PRINT PEG(I,J),
2040  NEXT I
2050  PRINT
2060 NEXT J
2070 PRINT:PRINT
2999 RETURN

3000 REM find a move
3010 FOR I=1 TO 3
3020  FOR J=1 TO 3
3030   IF PEG(I,T(I))<PEG(J,T(J)) AND OM%<>I THEN M1=I:M2=J
3040  NEXT J
3050 NEXT I
3060 IF OM%=M1 THEN HALT=TRUE
3999 RETURN
```

object is that a procedure is mainly a description of what to do (the data that it works on is more or less incidental) but a Smalltalk object is an indivisible ,mixture of data and procedure. It is difficult to describe the power of the object-orientated method without giving a large example. However, a simple example, coupled with a description of the philosophy behind it, should give you a flavour of the idea.

An object is a collection of data structures and methods which are descriptions of the allowable operations on the object. This definition fits in well with the ideas of data structures introduced in part two (see 'Data representation', August 1986). The difference here is that it is the data structure's responsibility to do things rather than have things done to it.

To make an object do something, you send a message to it that selects one of its methods. For example, if you were constructing an electronic mail system using traditional procedural methods, you would write a print routine that accepted as its input the data structure that held the text of a letter. In Smalltalk a letter would be an object and one of its methods would be a description of how to print itself! In a procedural system adding a new type of letter would mean altering all the print and similar procedures to accommodate the new data type, but in the Smalltalk system all you would have to do is introduce a new object complete with its methods and the rest of the system would remain unchanged. Notice also that each letter is an example of the same type of object in the same way the array A(I) is a particular example of the general class of things called arrays. In general Smalltalk allows you to define classes of objects and then generate as many particular instances of the object that you need.

> *'The question of what sort of applications Prolog is good at is something to which a lot of people would like to know the answer.'*

Object-orientated methods introduce one or two additional ideas for making the creation of objects easier, but it is the association of data and procedure within the object that is the most important idea. If what we are trying to do when we create a program is model the world, then why not model each of its objects as objects! In this sense creating a program becomes a matter of creating the right objects with the right properties and

```
4000 REM do move
4010 PEG(M2,T(M2)+1)=PEG(M1,T(M1))
4020 PEG(M1,T(M1))=0
4030 T(M1)=T(M1)-1
4040 T(M2)=T(M2)+1
4050 OM%=M2
4060 M1=M2
4999 RETURN
```

then letting them interact. One of the biggest problems with the object-orientated method is getting programmers to think of a program in terms of chunks consisting of objects. It is difficult enough to convince some programmers that modules are a good idea without trying to get them to organise both data and the procedures that operate on it together!

New methods for what?

Before you read the rest of this section, try making a list of all the programs that you can think of that do something directly useful — that is, don't include things such as operating systems, compilers, and so on, which are concerned with the process of supporting the computer, only programs that are concerned with real applications. I would be very surprised if you can make a list that includes more than 10 programs (most people only manage five or six)! If you do come up with more than 10 programs, my guess is that you are including process control programs as well as standard application programs — this isn't cheating, it's just a reflection of the fact that using computers to control other machines is a bigger field than simple information processing. Even so the total number of program categories is very limited when you think of the size of the industry that their production supports.

> *'The only real progress since the days of machine code and assembly language has been the gradual move away from the shortcomings and idiosyncrasies of the underlying hardware.'*

So are programmers making a living by continually reinventing the wheel? No, it's more than that; as yet, they have never managed to invent a satisfactory wheel! All the programs that we write are in some way provisional and the need to do better keeps us writing new versions. In the main what we have used computers for has set the pattern for what we want to use computers for, and so new categories of program are slow to emerge. (Perhaps the last new application category was the spreadsheet and this also introduced a programming method that certainly deserves further study — but that is another story).

What this means for the two new programming methods described above, and any others, is that programmers tend to judge them by how well they would cope with their current type of problems without asking the important question of whether they might actually extend the range of problems that a computer can tackle. For example, I can easily say that I wouldn't use Prolog to implement a word processor but I would find it much more difficult to make a list of the sort of things I *would* use it for. With Tubo Prolog being a best-seller I can't help wondering what all those people are doing with it. Are they wondering too? When it comes to Smalltalk, it is much easier to see what it is good at because it is good at all the traditional computer applications as well as having the potential to take us into new territory. I think that Smalltalk, is important now and for the near future but I think that declarative languages like Prolog are important for the long-term future. Perhaps 'declarative object-orientated programming' is what we need.

Conclusion

Programming is a vast subject and all I have tried to do in this series is cover some of the topics that are either current or interesting. There are so many more topics that could be included that I am sure to have missed something that someone will regard as a major omission. If you have followed this series I hope that I haven't taken too much of the fun out of programming for you; in proramming there are no rules, just opinions.

END

SOTEC

ON DISPLAY AT

ABC COMPUTERS

24 BURWOOD HIGHWAY
BURWOOD, 3125.
TEL.: 03-288-2144
03-288-9067
RBBS: 03-288-3599
FAX: 03-288-0781

PHC-1602
5¼" LQ Display $3100
PHC-1602
4¼" Gas Plasma $3800
PHC-1605
10 Meg 3½" Gas $5980

MODEM KITS
$180
Complete with case/power supply and instructions
300/300 1200/75 Ans/Orig.

PC-COMPATIBLE
$980 ex Tax
Includes your choice of up to 20 disks of software. You buy the disks at **$25** we supply s/ware you copy.

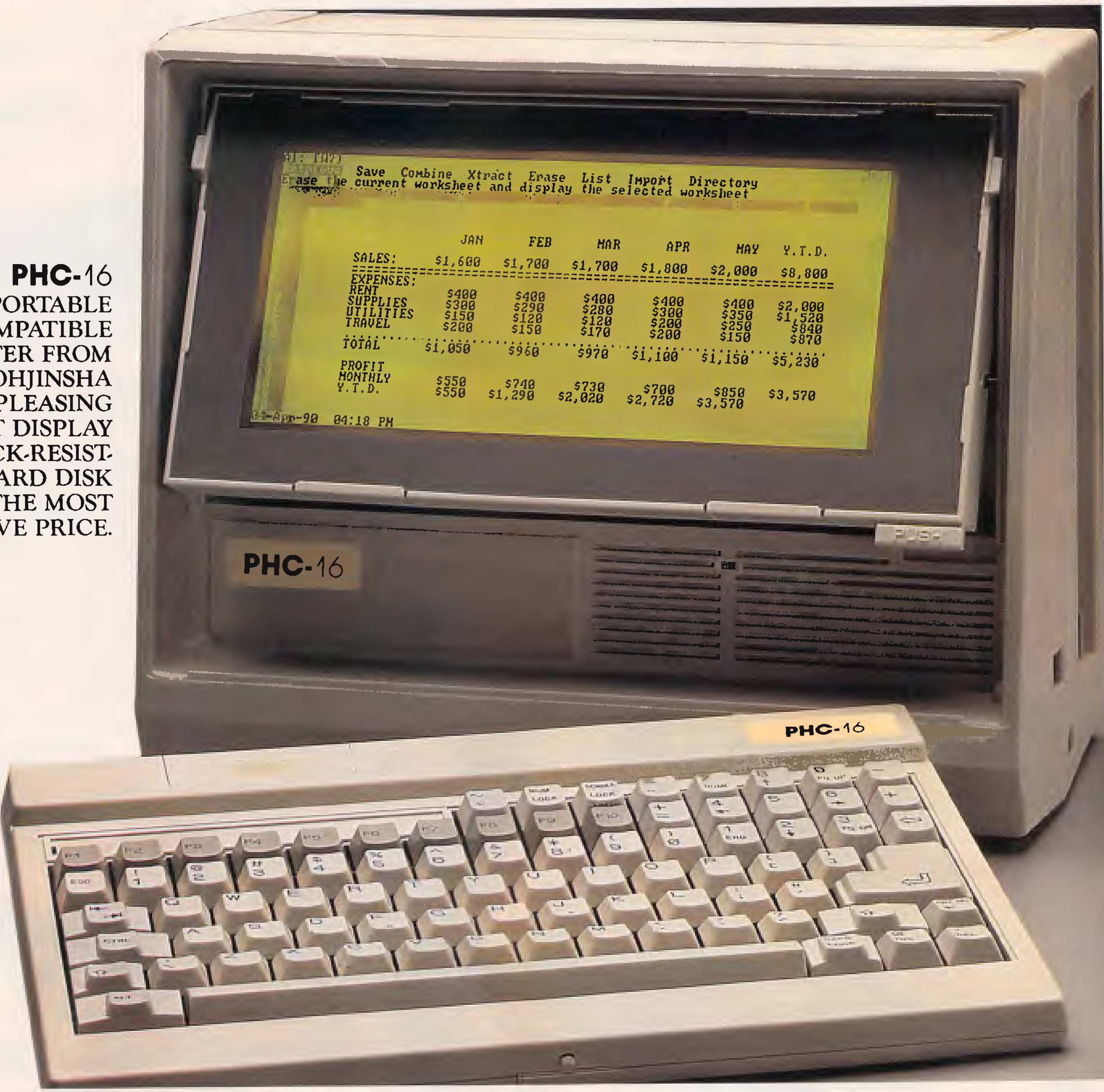
Public Domain Software
Educational — Business — Games
Utilities — Communications
Statistics — Music — Ect.

LOGITEC — SUPER 5

1201 — Ribbons	**$10.00**
Epsom MX80	**$7.50**
Epsom LX80	**$7.50**
Epsom LX86	**$8.50**

PHC-16
PLASMA EFFECT XT PORTABLE

PHC-16
A TRULY PORTABLE IBM** COMPATIBLE COMPUTER FROM JAPAN KOHJINSHA WITH AN EYE-PLEASING AMBER GASLIT DISPLAY AND A SHOCK-RESISTANT 20Mb HARD DISK WITH THE MOST ATTRACTIVE PRICE.



```
  Save  Combine  Xtract  Erase  List  Import  Directory
Erase the current worksheet and display the selected worksheet

                 JAN      FEB      MAR      APR      MAY     Y.T.D.
  SALES:       $1,600   $1,700   $1,700   $1,800   $2,000   $8,800
  =================================================================
  EXPENSES:
  RENT           $400     $400     $400     $400     $400   $2,000
  SUPPLIES       $300     $290     $280     $300     $350   $1,520
  UTILITIES      $150     $120     $120     $200     $250     $840
  TRAVEL         $200     $150     $170     $200     $150     $870
  ................................................................
  TOTAL        $1,050     $960     $970   $1,100   $1,150   $5,230

  PROFIT
  MONTHLY        $550     $740     $730     $700     $850   $3,570
  Y.T.D.         $550   $1,290   $2,020   $2,720   $3,570

[illegible]-Apr-90  04:18 PM
```

DEALER ENQUIRY WELCOME

PHC-1602 5.25" FDD, 512K MEMORY
PHC-16XT 3.50" FDD + 3.50" 20MB HARD DISK

- * 6 Kg weight/AC. DC. Car Adaptor 3-way power
- * 640 x 200 dot CRT & LCD/BACKLIT/GASLIT
- * 512KB memory expandable 1.25MB
- * Infra-red cordless keyboard
- * HIGH SPEED RAM DISK
- * CHINESE WORD PROCESSING.

MELBOURNE: VIATEL COMPUTERS PTY. LTD.
TEL: 288 2144

AUCKLAND: COMPUTER IMPORTS LIMITED.
TEL: 39 5344

SOLE DISTRIBUTOR: KOHJINSHA SOTEC PTY. LTD.
ADDRESS: 17 BRIGHTON ROAD, ST. KILDA 3182. MELBOURNE TEL: 534 0286 FAX: 534 0287

Compak's ZENO PC/XT Software Pledge:

Customers are free to return the computer for full refund in the first four weeks after purchase if they show the original disk of any commercially distributed program that runs on the IBM PC/XT and that cannot run on the ZENO PC/XT.

(Please note that programmes that use basic need to operate under GW Basic.)

ZENO PC/XT with all
specifications below
20 megabyte hard disk — **$1849** *inc tax*
Tandon slimline
$1295 *inc tax*

Technical Advantages of ZENO PC/XT

1. The standard speed of the IBM PC/XT is 4.77 M/Hz. The ZENO PC/XT zips along at 8.0 M/Hz although you can slow it down to IBM's pace at the flick of a switch. That's a full 68% faster for a machine thats half the price.
2. There is a front reset button for those that don't have arms as long as a gorilla.
3. The ZENO PC/XT gives you security. With the turn of a key you can lock out the keyboard while the computer is running. Great for little kids at home and bigger kids in the office!

ZENO
PC/XT

$1849
including tax
(monitor extra)

ZENO PC/XT Specifications:

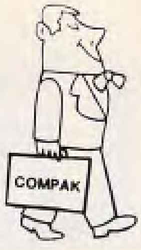
- * 640k on motherboard
- * Twin 360k drives
- * 8 slots
- * Multi-function card
- * Video card with colour/mono outputs
- * RS232 serial (second port optional)
- * Security key to stop unauthorised access
- * Front reset button
- * Parallel printer port
- * Joystick port
- * Light pen port
- * Battery backed up clock
- * Hinged lid for easy access
- * Sculpted ergonomic keyboard
- * 4 layer board for reliability

COMPAK

Compak Computer Centre

156 Martin Street, Gardenvale, Vic. 3185
Telephone: (03) 596 7222 Fax 5970126
Telex: AA 38029 Quote Ref. 841203 A.B. YEAS

PTY. LTD.



80286 POWER!

WHITE HOT VALUE

Compak's ZENO MINI-AT closely follows the standard forged by IBM with their AT Computer.

You can buy programmes with confidence that if they show "IBM-AT" on the jacket then it will run on the Zeno-AT.

And it purrs. Quietly, reliably, safely.

Fast too. A full 8 megahertz.

The keyboard is the most responsive that we have seen for any "work alike" to IBM's AT.

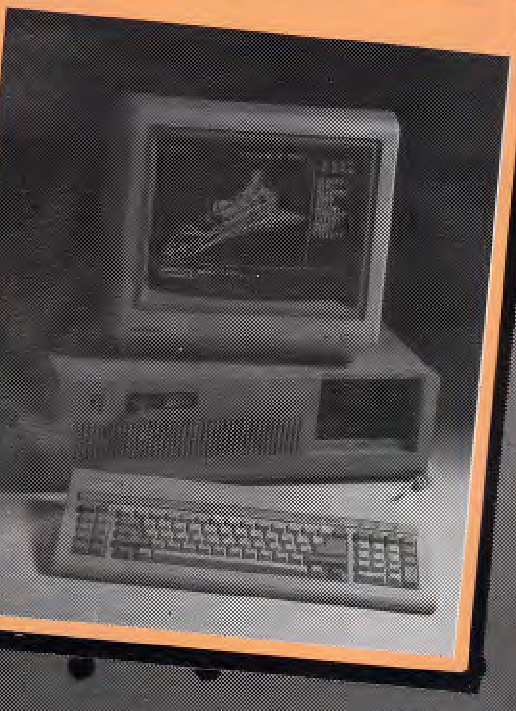
Compak can kit you out in monitors that reflect your need. From ultra high resolution monochrome to vivid EGA colour.

Compak gives a good straight ethical guarantee of 6 months including parts and labour. Because customers spread from Cooktown to Fish Creek we stipulate that the guarantee is return to base. That's the only "small" print.

Let's be straight. IBM set the standard. And they did it well. But how much are you prepared to spend to paste 3 letters on your box?

$3100 INC TAX

MINI-AT per specs	$3,100
Hard disk. Tandon 20 megabyte slimline	$950
Monitors:	
Hercules compatible High res Thomson TTL with c/over card	$350
Composite mono green	$225
EGA, TVM monitor with 256k EGA card	POA



Zeno MINI-AT

SPECIFICATIONS

Size:
Same footprint as PC/XT.
Colour graphics board:
RGB colour output. Composite colour output. Composite monochrome output.
Multifunction board containing:
Parallel printer port. Games port. Serial port.
Disk drive controller:
Hard disk controller. Floppy disk controller. 1 x 1.2 megabyte floppy disk drive (NEC).
Motherboard containing:
Real time clock with battery back up. 640k memory.
Keyboard:
Enhanced with large "special" keys and excellent tactile characteristics.
Processor:
80286. 6/8 megahertz.
Award BIOS.
MS DOS 3.1 inc GW Basic.

Literary choice

Although computers have made considerable progress over the past few decades with their literary outputs, there is still some way to go before a satisfactory solution is reached. David Levy examines how contemporary computer poets and authors are tackling the problmem.

It said that if a monkey were allowed to use a typewriter for long enough, it would eventually compose a Shakespeare sonnet. This statement may be theoretically justified, but practical considerations make it rather unlikely that either a monkey or a randomising computer program could create a literary work, even a very short one, within an acceptable time frame. William Shakespeare's vocabulary is estimated at approximately 27,000 words, so selecting words completely at random from this vocabulary would require approximately $125^{27,000}$ attempts in order to produce a 125-word sonnet that matched one of the Bard's own efforts.

Poetry

The problem of programming a computer to write poetry can be made considerably less random by applying some of the rules of grammar and creating a model of the poetic form. This idea of modelling was discovered by Louis Milic, an English professor at Cleveland State University, and used by Margaret Chisman and a number of other computer poets in the early 1970s. The concept is so simple that any programmer can emulate it to create their own computer poems. Chrisman wrote in the form that she wanted the computer to imitate.

For example:

My heart looks at life
Thrusting with growth but true
Always giving never having
Agony though softened corrupts.

Chisman then broke the poem down into distinct components as follows:

MY
(fixed)
(1) HEART
(noun singular subject)
(2) LOOKS AT
(verb present tense singular)
(3) LIFE
(noun singular object)
(4) THRUSTING WITH
(verb present participle)
(5) GROWTH
(noun singular)
(6) BUT
(linking word)
(7) TRUE
(adjective)
(8) ALWAYS
(linking word)
(9) GIVING
(verb present participle)
(10) NEVER
(linking word)
(11) HAVING
(verb present participle)
(12) AGONY
(noun singular)
(13) THOUGH
(linking word)
(14) SOFTENED
(verb past participle)
(15) CORRUPTS
(verb present singular)

In this example, the word 'my' is fixed but all the other words may be replaced by words that fit into the same category. The human author then supplies the program with a number of words or phrases for each category.

For example:

Group 1: head, eye, hand, reason, heart, child, flesh, mood

Group 2: thrives on, quickens with, delights in, shades into, leads to, craves for, yearns for, prepares for and so on, and the program is now able to generate new poems by replacing the original word or phrase in a particular group with a word or phrase chosen at random from the list in the appropriate group. For example, 'heart' may be replaced by any of the other words in group 1 and 'looks at' may be replaced by any of the other phrases in group 2, and so on.

In this way, the program may create an enormous number of completely different poems all derived from the same model. In the above example, if there are eight different words or phrases in each group, there would be 2^{45} (that is, 8^{15}) possible poems. By modifying the program so that it refrains from using the same word in each group more than once, it is possible to make every one of these poems completely distinct.

In the same way one could take a Shakespeare sonnet, break it down, and then synthesise any number of new sonnets. By programming the randomness within each group in such a way as to match up with the relative word frequencies and the frequencies of word pairs found in Shakespearian concordances, it might even be possible to create sonnets of such quality as would dupe a learned scholar into ascribing them to the pen of Shakespeare himself.

If the expert, and the layman, cannot distinguish between the quality and style of the sonnets written by Shakespeare and those churned out by a Commodore 64, are the computer-created sonnets not every bit as 'good' as their sixteenth century predecessors, and is the program's 'intelligence' really in dispute? R Goodwin would no doubt disagree with me (see 'Intelligent Reply', Letters, APC November), but I am convinced he is wrong. Great 20th artists have been compelled to produce convincing forgeries of the works of old masters, merely in order to gain recognition for their own genius at the easel, and it is surely ludicrous to argue against the obvious talents of a computer program which is capable of achievements which are considered superlative when exhibited by human beings. In the decades to come, when computers are as able at writing as they are already at chess and backgammon, there will be programs that can write letters as well as Mr Goodwin's.

Will he then claim that in the realm of letter-writing, such programs are less intelligent than he is? If so, what value does he put on intelligence?

A computer program capable of performing this task is a licence to print poems in unlimited numbers. One computer poet, Robert Gaskins, wrote a program to create haiku (Japanese poems containing three lines, split into five

LA·POÈTE

syllables, seven syllables and five syllables) and to display them on a video terminal. New haiku would appear on the screen, scroll slowly upwards and then disappear forever (unless Gaskins remembered to turn on his printer).

Richard Bailey, a professor at the University of Michigan who has published a book of computer poems, describes Gaskins and his computer program as . . . *'the most prolific poetic collaborators of all time. But there was never any sense of loss in seeing a haiku scroll up into infinity because another one would be along in a moment'.* Here are two of Gaskins' haiku:

Wandering in mist
Reaching out to soft sunlight
Blue-scaled dragons pause
Elk in mountain pass
Old man is speaking of snow
Lonely city, pale

These are not exactly my idea of poetry, but I certainly do not think they can be dismissed as being obviously lacking in content or style.

Following the early work on random selectivity, research began to concentrate on giving programs more involvement in the creative process by requiring them to devise the plot for a story. One of the most successful research projects was at the University of Wisconsin, where Sheldon Klein, a professor of computer science who was also a linguist, collaborated with his students to write a program that could create mystery stories. The stories were 2100 words long and would take only 19 seconds to write. Klein's group then went onto write programs to create Russian folk stories and operas!

Klein devised a simulator to generate the plot of a story. This simulator had three components:
(a) a special programming language that would generate and manipulate events within the domain of the story;
(b) a semantic network which consisted of the relationships between various objects in the plot; and
(c) a mechanism for describing changes in these relationships. Once the simulator had generated the plot in the symbolic language, it was turned into words.

The results of Klein's work may not appear impressive to the casual reader, but I would argue that they are comparable in quality with the plots which (say) a seven-year-old child might devise. For example:

The Popoviches live in a distant province.
The father is Vladimir.
The oldest son is Erema.
The younger son is Emelya.
The youngest son is Boris.
Elena is the only daughter.
Vasilisa also lives in the same land.
Vasilisa is of miraculous birth.
The dragon walks into the distant province.
The dragon demands Vladimir.
Elena refuses.
Elena calls for Vasilisa.
Elena anounces that the dragon demanded Vladimir.
Vasilisa leaves on a search.
Vasilisa meets a devil along the way.
The devil greets Vasilisa.
The devil asks Vasilisa to answer a question.
Vasilisa answers the question.
A magic flint is shown to Vasilisa.
A magic bow, a magic steed and a magic carpet come from the magic flint.
Vasilisa travels to the location of the dragon in another kingdom.
Vasilisa travels on the magic steed.
Vasilisa finds the dragon.
Vasilisa surprises the dragon.
Vasilisa kills the dragon with the aid of the magic bow.
The dragon is seized by Vasilisa.
Vasilisa starts back home.
The dragon's wives attempt to devour Vasilisa.
Vasilisa escapes by flying on the magic carpet.
Vasilisa returns home.

One of the limitations of Klein's early programs was that they did not capitalise sufficiently on the motivations of the individual characters in a story. This problem was investigated by Jim Meehan, an AI researcher at the University of California at Irvine, who wrote a program in 1976 called Tale-Spin. The program created stories about animal characters who had names such as George Ant and Irving Bird, and who lived in a simple world.

The human collaborator started the program off by giving each of the characters a motive, such as thirst. The characters then acted in ways that were related to this particular motive and which eventually satisfied a goal that was related to this motive. Finally, a translation routine converted the symbolic goings-on of the characters into natural language for human consumption.

Here is part of one of the stories created by Tale-Spin:

Once upon a time George Ant lived near a patch of ground. There was a nest in an ash tree. Wilma Bird lived in the nest. There was some water in a river. Wilma knew that the water was in the river. George knew that the water was in the river. One day Wilma wanted to get near some water. Wilma flew from her nest across a meadow through a valley to the river. Wilma drank the water. Wilma wasn't thirsty any more.

Later on in the story George Ant falls in the river (an idea introduced by the human collaborator), and is rescued by Wilma Bird (an idea derived from the program itself, because in the program the characters are all motivated to rescue other characters who are in danger of dying). The program would note the social relationships between the characters in a story and would ensure that all of them achieved their various goals, so the output stories would have happy endings.

Meehan's stories lacked purpose. Although they consisted of perfectly rational behaviour on the part of the characters, they were generally rather uninteresting. But some more recent work by Natlie Dehn at Yale University, which was the subject of her PhD thesis in 1984, has allowed the human collaborator to specify certain goals. The program, called 'Author', starts with a general idea for a story but then refines this idea or replaces it with a better one, and it can even remember an earlier idea and return to it later in the story.

Conclusion

Although the literary efforts of computers are impressive compared with the randomised poetry of the early 1970s, there still remain two important problems to be solved. Firstly, how does a computer decide what makes an 'interesting' story? What one person finds interesting, another may decide is extremely boring, so perhaps this is not the most crucial task that remains to be solved in the field.

This brings me on to the second problem, that of style. It is all very well having something to say, but if one wants to be read and appreciated by a wide audience, one needs to say it in an appealing way. I suspect that computers may not be able to do so for two decades at least.

Bibliography

Computer Poems by RW Bailey (Potagannissing Press)
Modeling Propp and Levi-Strauss in a Metasymbolic Simulation System by S Klein (Jason and Segal's *Patterns in Oral Literature,* Mouton).

END

Programmers

Turbo-charge your productivity with PL/PC

- PL/PC is a new programming language based in large part on APL (A Programming Language) with Modula-2 control structures. It offers an integrated interactive programming environment for the rapid implementation of applications.
- *Structured programming is supported with Modula-2 control structures, block structured declaration of subroutines and automatic paragraphing of subroutines. Multi-dimensional arrays are easily manipulated with the large set of PL/PC array operators. Fundamental data types are extended to include complex numbers and strings.*
- A full-featured full screen text editor is included, the editor will automatically position the cursor at the point in the source code where the last compile-time or run-time error was detected. Data are edited with a spreadsheet like data editor.
- *English keywords are used instead of APL symbols, eliminating the requirements for special keyboard, character generator and printer. DOS files can be structured to be manipulated as a single data item of any dimension or data type.*
- Graphic applications are supported with routines to draw lines, points, polygons, circles, conic sections and manipulation of data to/from screen.
- *Debugging facilities include tracing, stopping, single-stepping, timing and profiling.*
- A demonstration version is available for A$16. The demo version comes with a reference manual and it has a limitation of six global variables. The standard version is priced at A$159 and the 8087 version at A$299. All prices include airmail postage and handling.
- *PL/PC requires an IBM PC or compatibles with at least 360K of memory and DOS 2.11 or higher.*

See quick reference guide
on page 169 of October "APC"

Creative Computer Software

117 York St., Sydney, N.S.W. 2000, Australia.
Phone: (02) 261 1611 Fax: (02) 264 7161

The Creative Computer Company

The Complete Graphics, Typesetting & LaserPrinting Service

Now with Linotronic 100

(we can provide phototypesetting service from your word processor)

What We Can Do	**GRAPHS** **MANUALS** **DOCUMENTS** **TYPESETTING** **NEWSLETTERS** **FORMS DESIGN** **BUSINESS REPORTS** **ADVERTISING LEAFLETS** **PROMOTIONAL BROCHURES** **BUSINESS STATIONERY DESIGN** **DOWNLOAD FROM YOUR COMPUTER**

We have been 'Desktop publishing' and LaserPrinting since 1985 and now we can produce original artwork at 1200 DPI (true typeset quality) with the Linotronic 100.

Stay in touch from the first draft through to the final proof without having to leave your office with our facsimile service.

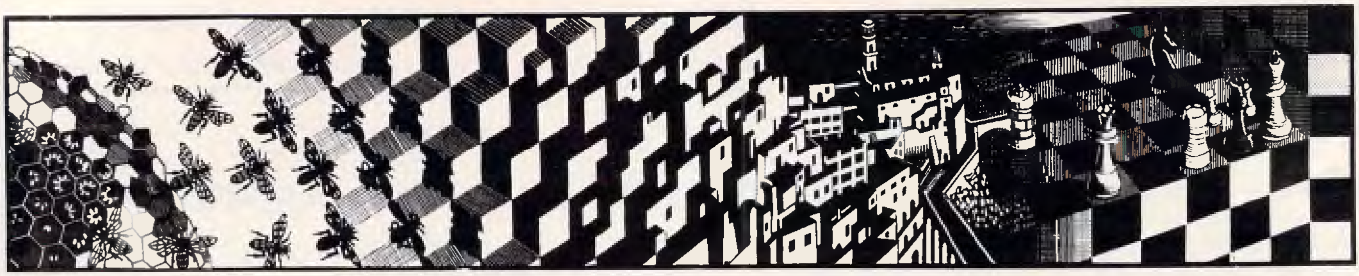
So call in soon and see for yourself what a difference a little creativity (and the latest technology) can make!

HEAD OFFICE

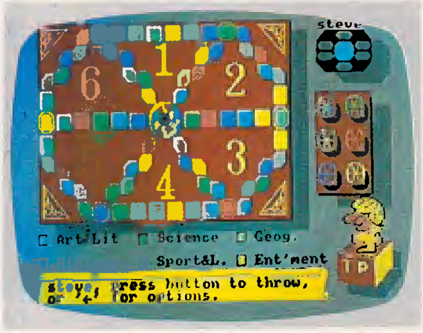
117 York Street
Sydney N.S.W. 2000
Telephone: (02) 261 1611
Facsimile: (02) 264 7161

BRANCH

123 Forest Road
Hurstville N.S.W. 2220
Telephone: (02) 570 8300
Facsimile: (02) 570 9873

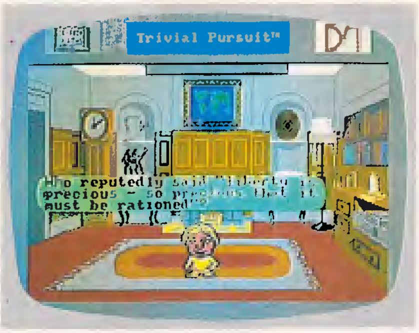


Once he's tested his general knowledge, Stephen Applebaum will regale you with tales of espionage and cunning.

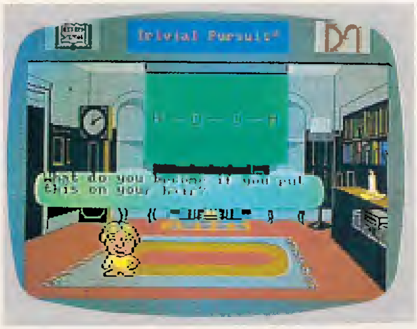


☐ Art&Lit ☐ Science ☐ Geog.
Sport&L. ☐ Ent'ment

steve, press button to throw, or '+' for options.



Who reputedly said "Liberty is precious – so precious that it must be rationed"?



What do you [illegible] if you put this on your hair?

Any questions?

TITLE: Trivial Pursuit
COMPUTER: Commodore 64; Amstrad PCW8256
SUPPLIER: ECP
PRICE: $39.95

One of the problems software houses face when they write a computerised version of a board game, is how much licence they can take with its looks and rules before losing the feel of the original. It isn't enough to just copy a game: people expect something more, even an improvement, simply because a computer is involved. On the other hand, it's difficult to know what to add or even alter slightly, without inciting the dissatisfaction of people familiar with the game in its paper-and-plastic format.

Monopoly and Cluedo have both suffered at the hands of progammers to different degrees. Now Domark, whose last game Split Personalities earned a certain notoriety, has tackled the most hallowed of all contemporary board games, Trivial Pursuit.

For those who haven't heard of Trivial Pursuit, and there can't be too many, it's a game where players proceed around a six-spoked wheel, answering questions from the following six categories: Art & Literature; History; Science; Sport; Entertainment; and Geography. A player's turn lasts until a question is answered incorrectly.

The subject area that a question comes from depends on the colour of the space that a player lands on after throwing a die. If a player gives a right answer while occupying a space forming a conjunction between one of the six spokes and the rim, then they not only get another throw, as normal, but also a 'wedge' in the colour of the subject category.

Players collecting wedges from all six categories proceed towards the wheel hub, where they are asked a question selected by the other players. The first person answering that correctly is declared the winner, leaving the rest to battle it out for the minor places, if they're so inclined.

That, in a nutshell, is Trivial Pursuit the board game. Although extremely simple, its concept cleverly exploits the latent pedant in us all; which is probably why coin-operated Trivial Pursuit machines do very well in pubs, where they've become another device individuals can use to impress their peers, having replaced arm wrestling with mental wrestling.

Domark's Trivial Pursuit maintains all the gameplay and design of the table-top archetype, but has so many nice little touches, you'd almost think the game had been designed for a computer in the first place.

The central playing screen accurately recreates the Trivial Pursuit board, except that the numbers 1 to 6 now reside in the spaces between the spokes. These represent the six faces on a die. To the right of the board is a representation of the playing token belonging to the player whose go it is; a status board, showing the progress of each player; and TP, an animated character who performs the role of question-master.

Eschewing the trite, animated dice favoured by many software houses, Domark has implemented the novel idea of having TP throw a dart at the numbers printed on the Trivial Pursuit board as the method of deciding how many spaces a player can move.

Unlike any other board game I've played, Trivial Pursuit's rules allow players to move in any direction, so there are often occasions when you can choose your question from several categories. Exactly the same is true in Domark's spin-off. But to make it easier for players to survey the options open to them, a cursor has been added to highlight the spaces that can be reached with the number hit by TP's dart.

Trivial Pursuit's question screen takes the form of a drawing room, and is one of the most inventive and beautifully detailed displays I've seen (note that I was looking at the Commodore 64 version).

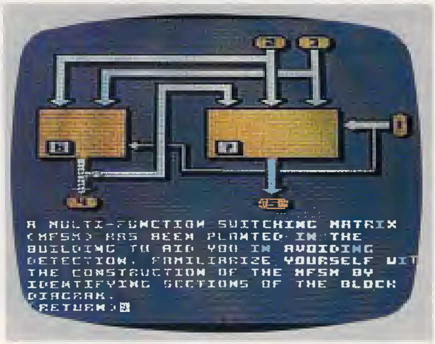
In the room there's a bookcase; a stereo system; a burning candle, used to indicate how much time is left to answer the question; a fireplace; a grandfather clock that shows users how long they've been playing Trivial Pursuit; and a pull-down projection screen.

Domark's Trivial Pursuit questions are far wider-ranging in the form that they can take, because unlike those of its cardboard counterpart, they are not confined to being written on cards. A computer has both sound and graphic capabilities, so why not use them? Questions about music often involve several bars of a mystery tune being played, while simple outline diagrams of well-known land masses crop up frequently in questions from the geography category.

The advantage that board games have over computer-based ones is their ability to draw several people together in friendly competition and conversation. Unfortunately, the same cannot be said for most video games. Even so, Domark has been astute enough to design its Trivial Pursuit so that the answer to a question is not displayed until the joystick's fire button has been pressed, giving people time to discuss the question. When the answer's finally revealed, the player whose turn it was to answer the question must then tell the computer whether he got it right. By doing that, Domark has invested the game with some phases where discussion is possible, rather than eliminating the human aspect altogether.

Trivial Pursuit, the computer game, captures nicely the feel of the original. My only reservation is over the number of times that the same questions seem to be asked, even after stopping a game and starting a new one. If you do run out of questions, Domark is selling additional question packs in line with those currently available for the board game.

The Young Players' version of Trivial Pursuit should be available by the time you read this.



```
A MULTI-FUNCTION SWITCHING MATRIX
(MFSM) HAS BEEN PLANTED IN THE
BUILDING TO AID YOU IN AVOIDING
DETECTION. FAMILIARIZE YOURSELF WI
THE CONSTRUCTION OF THE MFSM BY
IDENTIFYING SECTIONS OF THE BLOCK
DIAGRAM.
 RETURN>
```

Tinker, tailor, hacker, spy

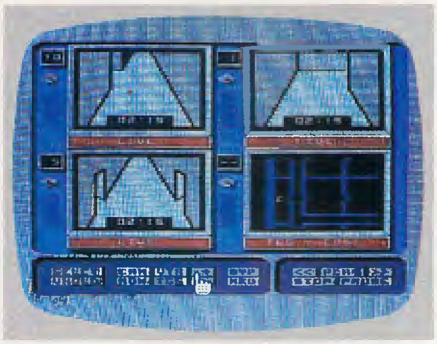
TITLE: Hacker II — 'The Doomsday Papers'
COMPUTER: Commodore 64/128, IBM PC
SUPPLIER: Imagineering
PRICE: $38.60

Hitting upon a formula that will appeal to the greatest number of people is the most important factor in any commercial enterprise. Once you have found what is popular, you can continue to use the same basic ingredients for every product, but alter the presentation in such a way as to make the public feel it's getting something new.

This philosophy has been employed in the film industry, with the latest example being *Aliens,* the sequel to *Alien*. And no sooner has it hit the big screen in Australia, than we discover that parts three and four are already underway.

If you're wondering what all this has to do with computer games, the answer is quite a lot. Recently, software houses have started remoulding old programs and doing much the same thing as the film industry.

One of the most recent sequels is Hacker II — 'The Doomsday Papers', a program which follows on from the very popular Hacker, in which the player's role is to travel the world collecting pieces of a secret document that have been dissipated throughout several countries. Now the challenge continues.



Hacker II is a story of paranoia, centred around the Americans' fear of finding a red under the bed. Just where would American games writers be without the Russians to blame for their innate sense of insecurity?

Like its precursor, Hacker II has you logging-on to a computer, only to find you've stumbled unwittingly into the middle of a major security crisis. This time, however, the US Government is in desperate need of *your* services, following the great job you did in recovering the document in Hacker. What, you didn't? Well, that doesn't matter; the US Government will hire you anyway.

This time, the job in hand is to recover the Doomsday Paper: a document authored by one Alexander Cherkazov, a top Russian scientist and political strategist, outlining a simple, yet effective, plan to overthrow the American Government. Unless the paper is wrested from its instigators, the whole free world could face its greatest danger since Ronald Reagan's inauguration.

There is one problem though: the paper has been stored inside a vault, hidden in a top security installation deep in the icy heart of Siberia. And to make matters worse, four pieces of paper holding the combination to the vault have been locked away in separate filing cabinets, each with its own access code. Your task is therefore further complicated by the fact that you have to get the codes for the cabinets, before even thinking about opening the vault.

If you've played Hacker, you'll be familiar with the opening phase where you have to identify the parts on a small robot device. True to the original, Hacker II has a similar sequence, though this time the parts to be identified are those making up a Multi Function Switching Matrix (MFSM) — and we all know what that is, don't we? For successfully completing this phase, the reward is a code number which allows you to go straight into the game next time you load it anew or restart an aborted mission.

Thus far, things are so similar to Hacker that you could be forgiven for thinking you were experiencing *deja vu.* It isn't until you get into the game proper that you really appreciate its individual qualities.

Although a sequel, Hacker II contains some extremely original and inventive set-pieces that bring it out from under the shadow of Hacker. Not least of these is the main display.

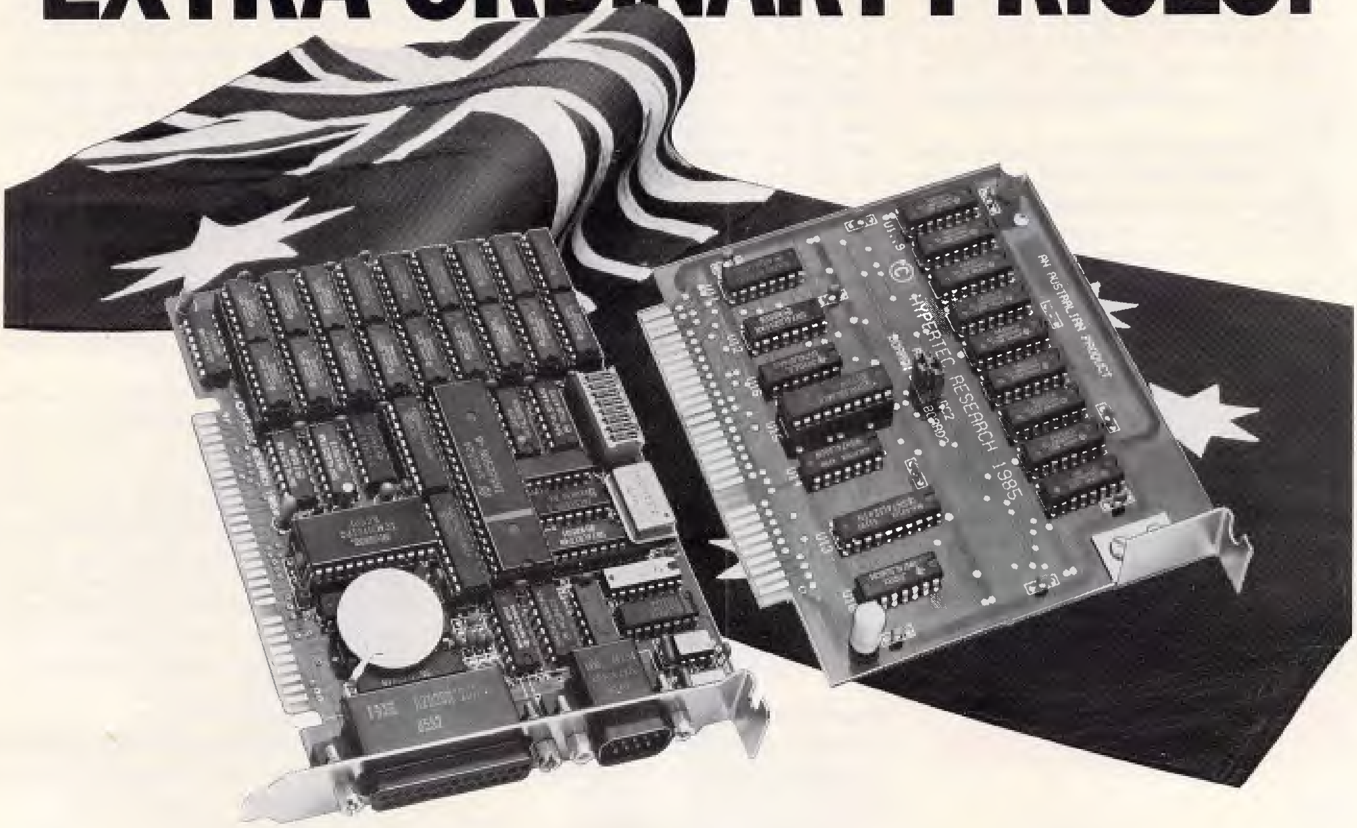
Graphically, Hacker II is quite excellent. The game's central display features four well-delineated TV screens, below which is a two-deck menu bar, whose functions can be selected using a small pointer under the control of your joystick.

When you first access this part of the game, the four screens are inactive and have to be switched on via a SELECT command. A screen, when first activated, will roll and has to be adjusted by altering its vertical hold.

The four screens are your eye onto what is happening within the installation and are an invaluable source of information. As well as the cameras, you also have three Mobile Remote Units (MRUs) equipped with Remote Optical Analysers (ROAs) under your control, for the express purpose of gathering information.

In play, then, Hacker II — 'The Doomsday Papers' is different in technique, but the same in scenario, to its predecessor, Hacker. However, if you've played the original game, don't discount Hacker II out of hand, because it does have some very nice features that are bound to surprise you.

EXTRA MEMORY EXTRA-ORDINARY PRICES!



Hypertec is proud to offer its range of memory expansion and multifunction boards for IBM PCs and true compatibles. Prices start from as little as $195.

THIS IS OUR REPUTATION

- These boards are designed to substantially increase the power, flexibility and range of uses of IBM PCs and true compatibles. They stretch your invested dollar a lot further.
- At last, a range of Australian designed and built boards – not imports.
- Being Australian products means that local support is available to both dealers and users – from the company which designed and built the boards.
- Highest quality – backed by full 12 months warranty from Hypertec.
- All this available at outstanding prices.

HYPER-256 MF:

A short multifunction board with 256 KB, serial and parallel ports plus clock (PC/XT).

HYPER-512 MF:

A short multifunction board with 512 KB, serial and parallel ports plus clock (PC/XT).

HYPER-PORT:

A short board with serial and parallel ports plus clock (PC/XT/AT).

HYPERAM:

A long board with up to 1.75 MB of expanded memory, 2 serial ports and clock (PC/XT).

HYPER-128AT:

128 KB memory board for the AT.

HYPER-384 AT:

384 KB memory board for the AT.

HYPER-256:

A short 256 KB memory board (PC/XT).

HYPER-512:

A short 512 KB memory board (PC/XT).

All boards come with full manual plus simple step-by-step procedures in plain English to make installation a breeze.

Dealer enquiries are welcome.

HYPERTEC

Advanced Technology

Hypertec Pty. Ltd.
Suite 404, Henry Lawson Business Centre
Birkenhead Point, Drummoyne, N.S.W. 2047
Telephone: (02) 819 7222. Telex: 177440

TO: HYPERTEC Pty. Ltd., P.O. Box 385, Drummoyne, N.S.W. 2047.
Please send me more information on the boards indicated and details of my closest dealer.

☐ HYPER-256
☐ HYPER-256 MF
☐ HYPER-512
☐ HYPER-512 MF
☐ HYPER-PORT
☐ HYPERAM
☐ HYPER-128 AT
☐ HYPER-384 AT

NAME: ______________________

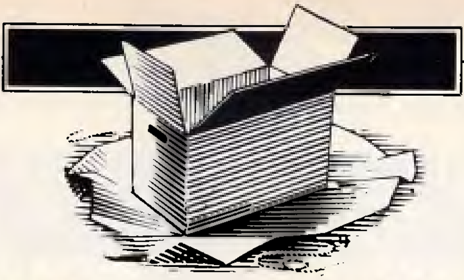
POSITION: ______________________

COMPANY: ______________________

ADDRESS: ______________________

______________________ PHONE: ____________

2465/FP/Little



WHAT'S NEW

Ian Davies checks out the most interesting new micro products announced over the last month.

Communications HELP!

The magic little time saver, Carbon Copy has now been released in a new package format which includes a modem and cable.

Carbon Copy is remote access software which enables support people to access a customer's machine just as though they were in the same room. It seems to be becoming quite popular with software suppliers, and that's not at all hard to understand. Although Carbon Copy isn't exactly cheap, it pays for itself as soon as one interstate trip has been avoided.

The new packaging features Carbon Copy software and a PC-Plus autodial 123 modem complete with cable. The HELP! pack is distributed by PC Plus on (03) 529 8976.

Tasword WP

Dolphin Computers has announced availability of a new word processor for the IBM PC.

The package is called Tasword PC and features horizontal scrolling, on-screen formatting, help, merge facilities, a tutorial and customisation. The package has been produced by Tasman Software, and has proved quite popular on other machines, particularly the Amstrad.

The word processor costs $79.95, and a demonstration disk is available for $5.00 with a $2.50 rebate. Dolphin Computers is on (02) 438 4933.

Aussie Framework II

A localised version of the popular Framework II package has been released by Ashton-Tate.

The new version features an 80,000 word Australian spelling dictionary and Australian date, time and currency formats. It is expected that the local customisation will aid Framework's penetration of the Australian market.

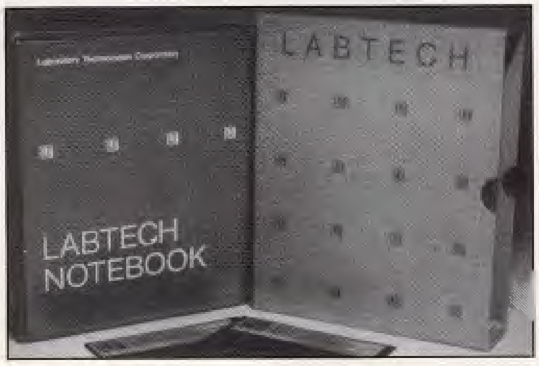
More information is available from Ashton-Tate on (02) 959 4620.

Real time I/O

Novatech Controls has released a new data acquisition and control software package from Laboratory Technologies Corp. The Labtech package allows standard MS-DOS application software to access real-time data captured by data acquisition hardware. Labtech integrates with Notebook, an acquisition and control language, forming a real-time pipeline to the users application software, such as 1-2-3, Symphony or dBase III.

Novatech has also introduced the EMC Datacare D910 clip-on radio frequency chokes to supress interface (RFI). RFI can spew out energy at up to 200MHz which may play havoc in measurement and control applications.

Novatech is on (03) 645 2377.



Computerised chatting

Following on from the new random telephone conversation facility introduced by Telecom, and in the fine old tradition of CB radio, the Melbourne-based company Microtex 666 has created the widest access computerised 'chat' facility in Australia.

Called Chat Line, the service is provided on Telecom's Viatel with 24 hour per day access around the country. The service simulates a scrolling terminal on a videotex page with messages and comments from users moving up the screen as the conversation progresses.

Chat Line has proved wildly successful, averaging just under 1,000 messages per day since being brought on line. The system is generally used about 20 hours per day, due to the time zones covered, and it is not uncommon to find 20 to 50 people chatting away in peak periods.

Microtex predicts that 'chat' technology will herald in a new dimension in computerised bulletin boards. More information is available from Microtex 666 on (03) 419 0666, or Viatel page *666#.

THE PROFOUND RANGE

For your total computing solution

- Fully IBM-compatible.
- Guaranteed to run any original off-the-shelf IBM-PC software.
- Standard machines come fully configured.
- All hardware is fully guaranteed and supported within Australia.
- Only quality components used.
- Machines are assembled under the strictest quality control.

Now with WORDSTAR 2000 PLUS FREE

Offer ends 31st January, 1987

PROFOUND is the registered trade mark of Eastern Micro Electronics.
IBM is a registered trade mark for International Business Machines.

FOR GENERAL AND DEALER ENQUIRIES CONTACT:

EME

MELBOURNE
215-217 PARK STREET,
SOUTH MELBOURNE, 3205.
Telephone: (03) 699 3088.
Telex: AA 38432.
Fax (03) 690 9562.

SYDNEY
Ground Floor, Fortune House,
88 FOVEAUX STREET,
SURRY HILLS, N.S.W. 2010.
Telephone (02) 212 6944.
Fax (02) 212 2245.

New SQL interface

The popular Oracle DBMS now provides the Easy*SQL user visual interface. Liberal use of pop-up windows, point-and-press, context sensitivity and menus mean that this interface provides end users with state-of-the-art user friendliness and power.

In addition to ad hoc query facilities, Easy*SQL can also perform report writing, colour graphics, table creation, maintenance and database update through fill-in-the-blanks techniques. Additionally, Easy*SQL incorporates the Easy*Link micro-mainframe communications facility and access to Oracle's Lotus compatible spreadsheet.

Easy*SQL is currently available for the PC and VAX versions of Oracle, with the other Oracle environments due for release later this year. More information is available from Oracle Systems on (02) 959 5080.

Prize money doubles

The first person to complete the new Commodore 64 game "Sultans Palace" can look forward to double the prize money expected. McCleary Software has increased the reward to $1,000 for any person able to complete the adventure game and supply the secret message.

Sultans Palace is an adventure game set in a mythical place in an unknown time. The objective is to rescue the beautiful Rebecca using a combination of text adventure tactics, arcade skills and gambling instinct. Several solutions exist to the adventure, and the game is never played the same way twice.

McCleary Software can be reached at Box 24, Emu Plains, 2750.

Non-dedicated Netware 286 LAN

Data Peripherals has announced the release of a new version of the Novell Advanced Netware 286 LAN operating system.

The new version takes advantage of 286-based machines and allows them to be both file servers and workstations. Application programs may use the full 640k address space of MS-DOS since network server activities take place in extended memory. The operating system runs with the 80286 switched into protected mode, unlike normal MS-DOS which leaves it in the 8088 emulation through real mode. The file serving workstation requires a minimum of 512k extended memory, and can handle up to 14 Mbytes and 100 users.

Data Peripherals is on (02) 888 5733.

Mulit-vendor Token Ring Access

Bridge communications has released the Tokenterm PC-DOS terminal emulator which allows PCs to access multi-vendor equipment over an IBM token ring LAN.

The software replaces the Bios INT 14 interrupt handler and allows emulation of virtually any type of terminal through the network. The package comes complete with a built-in VT100 and VT52 emulator, but transparently works with third party terminal emulators which make use of INT 14.

More information is available from Network Solutions, on (02) 957 2655.

Mac teaches IBM how to share

The Tops LAN allows Macintosh computers to coexist in the same network as IBM PCs, XTs and ATs through a distributed file server architecture and inter-operating system connectivity.

Tops consists of software for both the Mac and the IBM, utilising the standard AppleTalk card and a special Tops interface card for the PC. Security is available through file and record locking with optional password protection. Multi-user databases such as dBase III Plus can be used through the network.

Tops is distributed through Imagineering at a recommended retail price of $340 for the Mac and $890 for the PC including interface board and tax. Imagineering is on (02) 697 8666.

Multifunction board for XT-286

This could very well be one of the most 'chocka-block' expansion boards around, and is certainly the first we've heard of to be targeted specifically at the XT-286. The board, from IDEAsscociates, features an EGA display adaptor, parallel

LOW COST MAINS POWER SUPPLY STABILISER

HAVE YOU CONSIDERED THE MATSUNAGA STABILISED AC POWER SUPPLY?

MODELS IN STOCK FROM 350VA to 2KVA INPUT VOLTAGE 180V TO 260 VAC OUTPUT VOLTAGE 240 V± 3% (110V SIMULTANEOUS OUTPUT ALSO AVAILABLE)

Precision manufactured, accurate and efficient. Matsunaga automatic voltage regulators offer rapid voltage correction with zero waveform distortion. The units are of robust, but compact and lightweight construction and are ideal for applications where constant voltage is important.

ELECTROMARK PTY. LTD.
43 Anderson Road. (P.O. Box 184) Mortdale. NSW 2223
Ph: (02) 570 7287

Australian Personal Computer

Special

$6.95

22 REVIEWS OF IBM-COMPATIBLES

Part 2

BUSINESS COMPUTING

The Survival Guide

Main menu

CONTENTS

BUSINESS COMPUTING:
THE SURVIVAL GUIDE

Welcome to Part 2 of Business Computing: The Survival Guide. After having read Part 1 of this Guide most readers should now feel quite confident about buying a PC and know what to expect from it.

In Part 1 we covered various types of business software, a variety of computers (both IBM-compatible and non IBM-compatible), peripherals and communications.

It soon became apparent in Part 1 (sheerly by the small number of non IBM-compatible machines) that an increasing number of manufacturers are taking advantage of the wealth of MS-DOS software available and are competing in the IBM-compatibles market. Users and potential users are now becoming more aware of the computer market and will no longer buy a computer, no matter how good it is, if there is no decent software to support it.

Assuming you have now decided to buy an IBM-compatible machine, you are now faced with the unenviable decision of which one?.

The 22 reviews presented in this Guide stand independent of each other and are as objective as possible. The aim is not to compare the machines against each other, but to present an intelligent insight of what each machine does or does not offer. This enables readers to make up their own minds according to their own individual requirements and preferences; a classic case of 'one man's meat is another man's poison'.

The rest of the guide is divided into three sections: finance, hidden costs and working with computers. A glossary is given to decipher any of the jargon that may have missed the editor's eye, and a suppliers' list gives details of whom you can contact for more information.

Part 1 of the Survival Guide is available at most newsagents. If you are having trouble obtaining Part 1, a copy may be secured direct from the Publisher by contacting Roula Tsitos on (02) 264 1266.

INTRODUCTION

PUTTING PCs IN PERSPECTIVE 4

Not all compatibles are created equal. Some are more compatible than others, while some can be faster or slower. Ian Davies sheds some light on these somewhat misleading facts.

HIDDEN COSTS

ACCESSORIES AFTER THE FACT 128

The initial purchase price of your PC is only the beginning. Jan Smith reports on where your money will go to keep your computer running smoothly.

Editorial *Editor* Maria Bokic. **Advertising** *NSW and Qld Sales Manager* Yossi Croitoru 02) 264 1266; *Vic. SA WA and Tas Sales Manager* Samantha Bates (03) 531 8411. Published by Computer Publications Pty Ltd (a subsidiary of Consolidated Press (Holdings) Ltd). Sydney: 215 Clarance Street, Sydney 2000; telephone (02) 264 1266; telex AA 26514 CONPRES. Melbourne: 77 Glenhuntly Road, Elwood 3184; telephone (03) 531 8411; telex AA 30333 AMJ
Printed by Quadricolor Industries Pty Ltd. Material contained within *Australian Personal Computer's Business Computing: The 1986 Survival Guide* is protected under the Commonwealth Copyright Act 1968. No material may be reproduced in part or whole without written consent from the copyright holders. Produced under licence from Computing Publications and VNU Business Publications B.V.

WORKING WITH COMPUTERS

ERGONOMICALLY SPEAKING 131

Ergonomic furniture is expensive but for the full time computer user it is prevention against RSI and other such health risks. Graham Hardy explains what you should look for and how best to use it.

PC SECURITY 137

Corrupt disks, hackers and even rodents are all threats to data security. Jan Smith explains what to look for and what measures you can take to protect your data.

ON THE RIGHT COURSE 141

Rebecca Nash looks at current computer training courses designed for users to get optimum performance from computer hardware and software.

DATA ENTRY 148

Computer users need no longer be restricted to sitting in front of a PC tapping on a keyboard. Kevin Bergin describes several data entry devices which give greater freedom to users and may be more suitable to your line of work.

FINANCE

IT'S YOUR CHOICE — RENT, BUY OR LEASE 151

The old adage, why use your own money when you can use someone else's' has been tried and proven by many successful businessmen. Stephen Kelley examines viable options to buying a computer which may suit your wallet better.

ARE YOU COVERED FOR THE UNEXPECTED? 157

There is no such thing as a convenient time for a computer to break down. Jan Smith stresses the importance of dealer support and maintenance contracts in such situations and how computer insurance can help.

GLOSSARY 162
SUPPLIERS' DETAILS 166

COMPUTER SYSTEMS

SYSTEM REVIEWS 15

Kevin Bergin, Ian Davies and Kester Cranswick present a 63 page report of current IBM PC compatibles. The reviews have been divided into three categories: PC-compatibles, AT-compatibles and Portables. A summary of machines reviewed is presented at the end of each section.

PC-COMPATIBLES

Amstrad PC1512 15
Atlantis PC/XT 45
Basic Time BTurbo. 41
Cleveland PC II 22
Epson PC Plus 28
Kaypro PC 49
Leading Edge PC 32
Olivetti M24SP 55
Profound PC/XT Turbo 59

AT-COMPATIBLES

A*Star II 65
Compaq DeskPro 386 73
DSE Multitech 900 106
NEC APC IV 79
Osborne AT 88
Sperry IT 96
Tandy 3000 92
Televideo 286 85
Zenith Z-200 100

PORTABLES

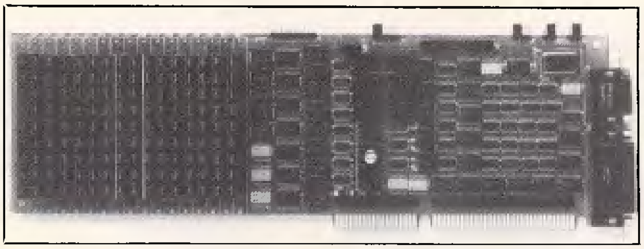
Bondwell 8 110
IBM Convertible 122
Sotec/Datavue 114
Toshiba 2100 118

ON SALE NOW
AT LEADING NEWSAGENCIES

port, communications port and 16Mbytes of memory.

Using surface mounting technology and SIMMs (Single In-line Memory Modules), the board attempts to provide the complete upgrade for XT-286 users. By expanding the machines memory up to the physical maximum in one step, the board claims to be prepared for the opportunities offered by the coming release 5.0 of MS-DOS, as well as addressing the existing Xenix user base.

The 'All Board 286' is priced between $1,500 and $14,000 depending on memory requirements. IDEAssociates is on (02) 387 5222.



Aussie universal disk copier

Pulsar Electronics has released the Pulsar 7000 universal disk copier which can handle more than 130 disk formats.

The system consists of a 80186 CPU with one Mbyte of RAM running MS-DOS, Turbo DOS, CP/M-86 or CP/M-80. Included are two 5.25 inch drives, a single 3.5 inch drive and provision for an optional 8 inch external drive. Originally designed for multi-media educational environments, the system is expected to be of use to any organisation running a range of computer types or in the business of exchanging data.

The system is available for $5,900 including tax from Pulsar Electronics on (03) 330 2555.

MacMemory expansion

MacMemory is a company specialising in expansion boards for the Macintosh, and its latest products include the MaxPlus memory expansion board which allows the Macintosh Plus to be expanded up to 2Mbytes of RAM.

This added memory can be used for mammoth spreadsheets, RAM disks or disk cache utilities. The board comes complete with the MaxRam and MaxPrint RAM disk and print spooling utilities, and is priced at $1,190 inclusive of tax and a one year warranty.

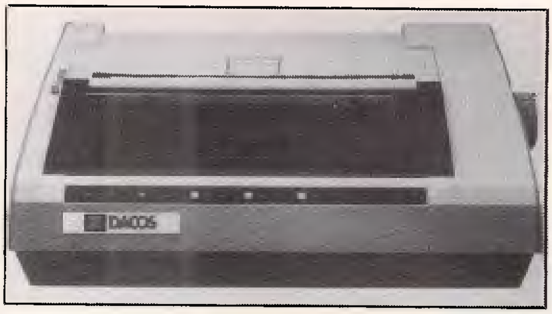
The same company also produces MaxSave, a combination hardware/software product which plugs into the ROM sockets to provide a recoverable RAM disk. MaxSave is priced at $334 and includes the MaxPrint utility.

Both products are distributed by Imagineering, on (02) 697 8666.

Low cost 180 cps printer

A new low-cost printer from Data Cable provides draft printing speeds of 180 cps through a nine wire dot matrix head.

The Dacos VP 1814 provides a number of different print modes which can be selected from the front panel. Near letter quality, superscript and subscript, graphics and justification are all supported and indicated via eight front panel LEDs. Most importantly, the printer is compatible with the IBM and Epson control codes. The VP1814 has a recommended retail price of $543 including tax, and is available from Data Cable on (03) 729 0044.



See-thru desk

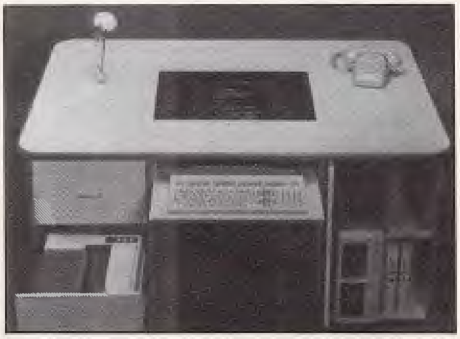
The possibilities are endless.

However, this ergonomic desk offers a novel solution to the problem of hardware cluttered desks. The computer tucks into various little nooks and crannies to become an integral part of the desk.

The keyboard slides out from under the desk top; the system unit is mounted vertically in one leg; and the printer is tucked away in a draw. The all important screen is subtley placed beneath a low glare glass top. The end result is a completely hidden computer and a totally bare desk top, except for telephone and flower, of course. Using the machine is simply a matter of clearing off any papers, sliding out the keyboard, printer and opening the system unit recess, and switching on.

Just imagine the look on your friends' faces.

The desk is available from Sylex Ergonomics on (02) 647 2888.



New colour plotters

The Versatec CE 3400 range of colour plotters now offers more than four times the resolution of previous models by providing 400 points per inch resolution.

The plotters are electrostatic, and can plot on paper ranging from 24 to 36 inches in width. Ouput is said to be near photographic quality and the plotters are especially targetted at VLSI design, mapping, solids modelling and any other high resolution applications.

SINGLE BOARD COMPUTER

SPECIALS

from ASP MICROCOMPUTERS

AMPRO 80186 Little Board
was $999 **NOW $699**

AMPRO Z80 Little Board
was $549 **NOW $425**

PC CLONE (Megatel Quark)
was $860 **NOW $699**

(plus Sales Tax)

(03) 500 0628

BARCODE READER

- IBM PC/XT & clones
- Connects between keyboard & PC
- No software drivers needed
- Automatic code distinction
- Australian made
- Includes WAND

$649 plus ST

ALSO AVAILABLE: RS232 Readers, Readers/Printers, Label printing software $90, OEM Modules.

ASP MICROCOMPUTERS
P.O. Box 259, Caulfield East 3145
(03) 500 0628

MAC PLUS

cable assemblies

MADE IN AUSTRALIA
by

KENT DESIGN

(03) 509 8751

10 Claremont Avenue,
Malvern 3144

VIDEO TERMINAL $299!

- Just add an IBM PC compatible keyboard and monitor
- Up to 38,400 baud!
- Emulates various terminals

ASP MICROCOMPUTERS
P.O. BOX 259
CAULFIELD EAST 3145
(03) 500 0628

KAYPRO

AMERICAN QUALITY

Dual Speed TURBO
768K RAM
V20 Processor

KAYPRO PC $2395
2 x 360K Drives
Multivideo Board

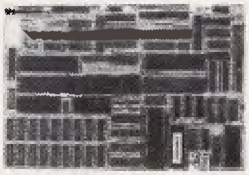
KAYPRO PC30 $2995
1 x 360K Drive
1 x 30M Hard Disk

Full 12 Months Warranty

FIFTH GENERATION SYSTEMS PTY. LTD.
(03) 29 2600
P.O. Box 103 Camberwell 3124

PC Clone

SINGLE BOARD COMPUTER



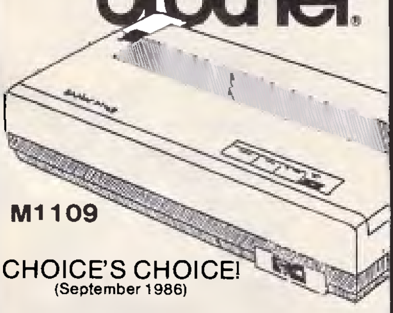
- HALF the size of this page!
- Colour & Mono Output
- Includes Disk Controller
- Legal BIOS, Boots MSDOS
- Printer Port, 2 x RS232 Ports
- PC Keyboard Port
- 256K or 512K RAM
- High Speed Version available

ONLY $999 (incl. ST)

ASP MICROCOMPUTERS
P.O. Box 259, Caulfield East 3145
(03) 500 0628

---

brother



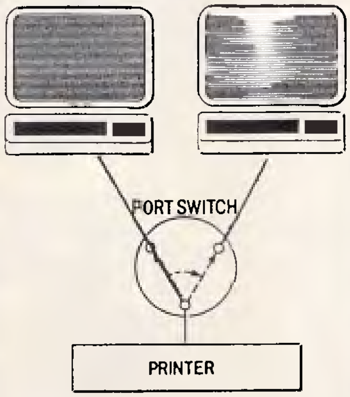
M1109

CHOICE'S CHOICE!
(September 1986)

- 100 cps plus NLQ matrix printer
- Super compact
- RS232 & Parallel Interface
- EPSON/IBM compatible
- APPLE IMAGEWRITER code model optional

Retail only **$549** (Incl. ST)
BUT RING FOR ASP's PRICE ON THIS AND ALL BROTHER PRODUCTS!
ASP MICROCOMPUTERS (03) 500 0628
P.O. Box 259, Caulfield East 3145

PORT SWITCH



Share a printer. Up to 5 PC's can share one printer. Serial or Parallel.
Made in Australia.
KENT DESIGN (03) 509 8751
10 Claremont Avenue, Malvern 3144

TANDY 1000

Everything for the 1000!

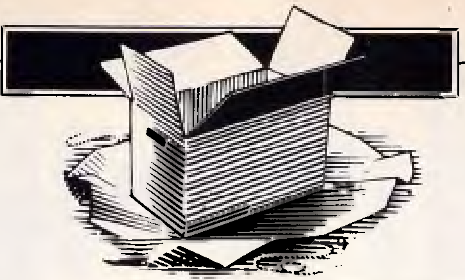
- COMBI/1000 - single slot memory to 640K, RS232, DMA
- Internal 10 & 20 Meg Hard Drives
- Floppy Drives
- Barcode Reader
- COMPLETE SYSTEMS

NEW! 2 MEGABYTE RAM FOR 1000!

Ring for brochure/price list

ASP MICROCOMPUTERS
P.O. Box 259, Caulfield East 3145
(03) 500 0628

Price subject to change without notice.

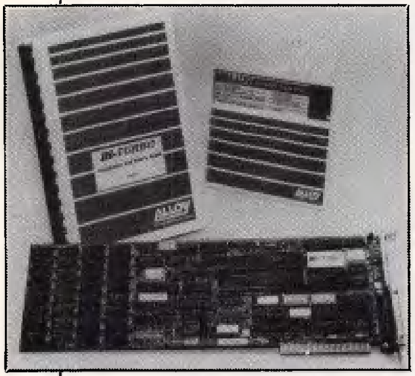


E-size colour plots can be generated in just over eight minutes, or monochrome plots in less than 60 seconds.

Additionally, a new version of the Spectrum plotter now offers 400 ppi resolution in colour in an 11 inch format. A-size plots can be completed in 75 seconds.

The Versatec range of plotters is distributed by Anitech on (02) 648 1711.

Alloy Bi-Turbo



A new expansion board from Alloy Australia aims to enable PC users to run extensive background tasks concurrently.

The Bi-Turbo board provides a V20 CPU, 640k of RAM, 256k of disk cache RAM and a second serial port. The idea is that background tasks run entirely in the second processor, thereby proceeding at normal speed, without affecting the performance of the foreground task and minimising unwanted interaction.

Based upon Alloy's PC-Slave concept, the Bi-Turbo board has been used to run BBS systems in background mode, provide interbranch communications without hardware or data redundancy and free up PCs while lengthy monthly or weekly runs are in progress. The board sells for $1,475.

More information is available from Alloy on (03) 561 4988.

New leader

Interesting.

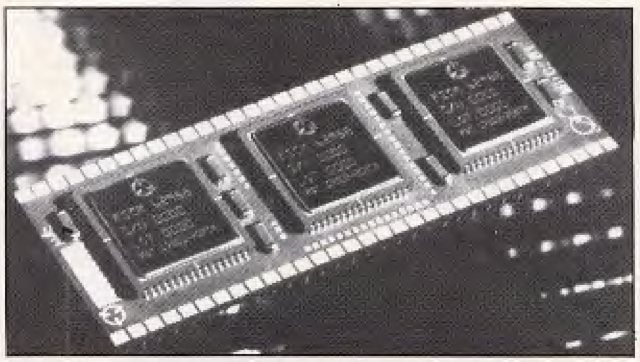
NEC claims that for the first time in the Australian computer industry, IBM has been outsold by a single machine in the 80286 market. It seems that the APC IV has picked up 30.3 percent of the market, with the IBM AT slipping to a second place with 28.3 percent. Third place goes to the HP Vectra with less than half of the sales of either IBM or NEC.

F/A-18 board

No, not a simulation. The real thing.

McDonnell Douglas has built a powerful new microprocessor which improves processing throughput of the F/A-18 Hornet fighter aircraft by 80 percent.

The MC D281 processor forms the heart of the signal data computer, and replaces eight other avionics boxes used in earlier F/A-18s, while being only one third of the weight. The computer receives input from sensors scattered throughout the aircraft — from fuel tank to engines. In addition to automatically identifying electronic faults, the MC D281 also controls the movement of fuel between the various tanks, allowing the Hornet to dynamically change its centre of gravity.



Aussie hand-held computer

The TCG Group has announced the launch of a unique Australian manufactured hand-held computer called the Australian Diplomat.

The machine has been produced jointly by TCG and the UK-based Parcon Industries. The unit features surface mount technology, LCD display of eight lines by twenty characters with optional back lighting, optical communications, hand contoured case and resistance to dirt and water. It is equipped with 64k of CMOS RAM, but may be expanded up to 1.5Mbytes.

More information is available from TCG on (02) 699 8300.

IBM uses proprietary chip

In what *may* be a taste of things to come, IBM has utilised custom integrated circuits in its personal computers for the very first time.

The IBM 'open architecture' means that IBM has, to date, constructed PCs from third party components available from a variety of vendors. This has meant that other manufacturers could easily build PC compatibles.

The clone industry has been dreading that one day IBM would release a new model featuring chips with no identifying information stamped on them other than '(C) IBM'.

That day is now, although it's really nothing to panic about just yet. The XT-286 PC features proprietary IBM memory chips — little sticks of 256k which IBM has designed and fabricated all on its own.

Phoenix 80386

Phoenix Technologies, the people who have supplied a compatible Bios to most of the clone manufacturers and whose stamp is considered by many to be synonymous with close compatibility, has made its first foray into the 80386 market with a Bios customised for that chip.

The 80386 ROM Bios features full 32-bit memory testing, support for processor speeds as high as 20MHz, and takes advantage of the 80386 capabilities for functions such as mode switching, virtual disks and overlay management. No doubt many more 80386-based AT-compatibles are waiting in the wings, a good percentage of which will probably emerge sporting a Phoenix Bios.

//Micro//Mania

Doslock - Hard Disk Security **$149**

KAYPRO PC Dual Drives **$2195**

KAYPRO PC 20 20 Meg System **$2799**

Miniscribe 71 mb Disk **$2999**

Bugboard Mono/Col/Her **$295**

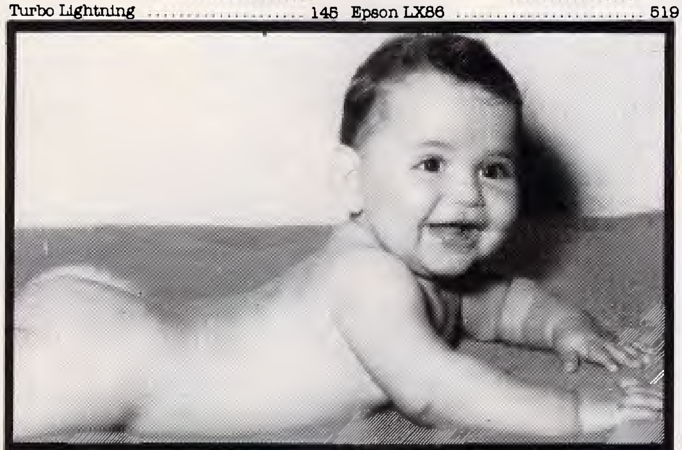
Seagate 30mb Hard Disk Kit **$1160**

SOFTWARE

C Compiler - Microsoft	829
Chartmaster	625
Clickart Personal Publisher	289
Clipper	949
Cobol Compiler - Microsoft	1139
Crosstalk XVI	199
DAC Accounting + Tutor	230
DAC Database	139
Daybook - Accounting Cashbook	169
Desqview	159
Diagram Master	651
Disk Manager - Surpass 33 Meg!	199
Fastback	179
Doslock - Hard Disk Security	149
Fastgraphs	380
First Choice	380
Flight Simulator	105
Formeasy Desktop Publisher	990
Fortran Compiler - Microsoft	620
Framework II	1060
Graphwriter	895
Hal From Lotus	270
Harvard Presentation Graphics	595
Harvard Project Manager	679
Javelin	1277
Mace Utilities	130
Macro Assembler - Microsoft	350
Mirror	95
Multimate 3.31	735
Multimate Advantage	884
Multiplan	350
Nortons Editor	208
Norton Utilities	134
PFS File	199
PFS Write	199
Printshop	103
Printworks	134
Prodesign II	599
Q & A	629
Quality Analyst	629
Quick Basic	175
Rbase 5000	830
Reflex Version 1.1	216
Remote	227
Sidekick	78
Sideways	138
Sign Master	442
SPSS/PC Advanced State	1015
Statpak	669
Story Board	515
Super Calc IV	595
Superwriter	377
Superkey	115
Superproject Plus	625
Timeline	699
TK! Solver	483
Transporter	323
Turbo Database Toolbox	99
Turbo Editor Toolbox	99
Turbo Gameworks	99
Turbo Lightning	145
Turbo Pascal BCD & 8087 Ver 3.01	145
Turbo Pascal Graphics Toolbox	104
Turbo Power Tools	216
Turbo Tutor	89
Twin - 123 Lookalike	232
Typequick	83
Windows	199
Wizardry	103
Word - Version 3	720
Wordperfect	652
Xtree	99

PRINTERS

Brother 1709	1059
Brother HR20	888
Brother 1509	910
Brother HR15XL	679
Brother HR35	1454
Brother M1409	775
Brother M1109	472
Brother Twinwriter	2359
Epson LX86	519
Epson FX105	1050
Epson GX80	440
Epson LQ1000	1499
NEC P5 Pinwriter	1733
NEC P6 Printer	912
NEC P7 Printer	1199



"Don't let the sharks take the shirt off your back - shop at **Micromania**"

HARDWARE

80287 AT Maths Coprocessor	462
8087 Maths Coprocessor	287
8087-2 Maths Coprocessor	410
AST - Sixpak Plus + Desqview	375
AST Fourport/Xenix	865
EGA Compatible Card	499
EGA Monitor - TVM	999
Floppy Disk Drive - PC	249
Hercules Graphics Card Plus	550
Hypertec Hypervid	1199
Hypertec Hyperport	355
Hypertec Hyperace Speed Card-10 meg	1080
Intel Above Board - AT	869
Intel Above Board - PC	599
Irwin 20 Meg Tape B/Up - XT	1299
Irwin 20 Meg Tape B/Up - AT	1395
Archive 60 Meg Tape B/Up - XT/AT	1899
Memory Chips - 4164 9 Chips	30
Memory Chips - 41256 9 Chips	62
Microsoft Mouse	364
Miniscribe 44Mb-Fast	2199
Monitor - Thomson 14" RGB	710
Monitor - Thomson TTL Amber	280
Monitor - Thomson Composite	240
Multilink	1124
Bugboard - Mono/Col/Hercules	295
PC Colour Graphics Card	159
PC Floppy Disk Controller	114
PC Memory Card	130
PC Mono/Graphics Card	199
PC Multi I/O Card	249
PC Parallel Card	80
PC Serial Card	80
PC Dual Serial Port - AT	244
PC Quad Serial Port - AT	299
Parallel Printer Cable - PC	35
Power Supply (135 W)	199
Seagate 20mb Hard Disk Kit	995
Seagate 30 Meg Hard Disk Kit	1160
Seagate 30 Meg AT Disk	1479
Fuji DS/DD 3 1/2" Disks	75
Fuji DS/DD 5 1/4" Disks	36
Fuji SS/DD 5 1/4" Disks	27
Vega Card	939
Wyse Terminals	Call

MODEMS

Netcomm 1200 In Modem	618
Netcomm 123 In Modem	846
Netcomm 1234 In Modem	1048
Netcomm 2400 In Modem	834
Netcomm 3 + 12 Manual	209
Netcomm Smartmodem 1200	628
Netcomm Smartmodem 1234A	1225
Netcomm Smartmodem 2400	895
Netcomm Smartmodem 123A	1005

Irwin 20 Meg Backup - XT **$1299**

TVM EGA MONITOR **$999**

640K Memory Card - ØK **$130**

AT 6 Pak + Desqview **$375**

Brother 1709 **$1059**

Thomson TTL Monitor **$280**

STRIPPED TO THE BONE!!!

LOTUS	**$639**
DBASE III	**$875**
SYMPHONY	**$870**

Australia's leading PC discounters

(02) 569 0232

180 Parramatta Rd, Stanmore N.S.W. 2048

All prices include sales tax. We accept Bankcard, Mastercard and Visa. We have the largest range of PC products in Australia. Call us for a quote and a free catologue-newsletter. All products carry full distributors warranty and support and are latest release versions. Delivery extra - call for rates. Prices may change due to factors beyond our control. Our bulletin board number is 568 2196 - 1200 baud.

Dear Christine,

I want to become a Micromaniac today! I wish to:

☐ receive your latest newsletter and catalog with over 600 products listed.

☐ receive free registration on your Bulletin Board System.

☐ be placed on your mailing list to be kept regularly up to date with latest product releases and special offers.

Name ....

Company ....

Address ....

.... Postcode ....

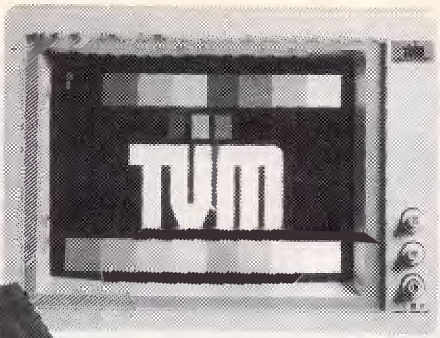
My computer is ....

Send to: Christine, Micromania 180 Parramatta Rd, Stanmore NSW 2048 APC

TVM

MD System

The Professional Monitor Company



MD-7 MULTI-SCAN EGA MONITOR

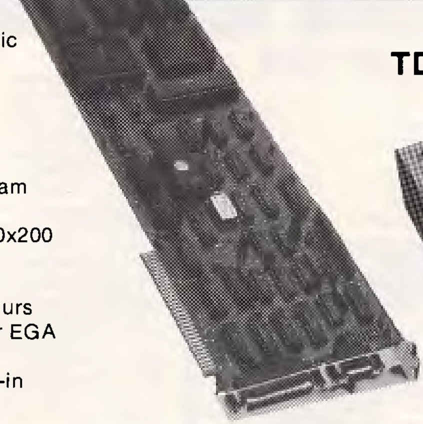
- Super Hi-Res EGA Monitor
- Compatible with IBM Enhanced Graphics Adaptor
- Dual Frequency 15.75 to 21.85 KHz
- Resolution 640x200 to 720x350 pixels
- Switchable Green/Amber/16 to 64 colours

MD-3 MULTI-DISPLAY HI-RESOLUTION RGB MONITOR

- Compatible with CGA & most PC systems
- 14" Dark tint/non-glare screen
- Resolution 640x200 pixels
- Includes Green/Amber/Full-colour switch
- RGB TTL input level

DIGIS-1000 EGA CARD

- Provides multiple display modes: Enhanced Graphic Adaptor Colour Graphic Adaptor Mono/Graphic Display Adaptor
- 256K Dynamic Ram Screen Buffer
- 16 Colours in 640x200 to 720x350 in Monochrome
- Supports 64 colours in 640x350 under EGA mode
- Printer port built-in selectable LPT1, LPT2, LPT3



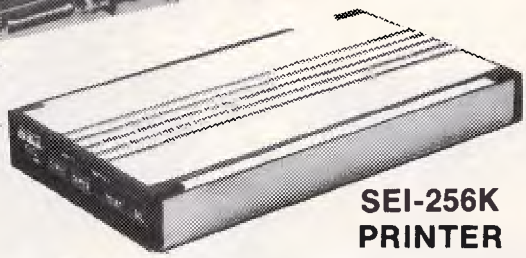
TDB-60 60MB CARTRIDGE TAPE BACK-UP

- Compatible with AT/XT
- 60MB Tape capacity with DC600A cartridge
- QIC-24 data format
- Image back-up or file-by-file back-up
- Soft loading & eject mechanism
- Transfer rate 90K bytes/sec
- Tape speed 90IPS
- Internal or external version available

KEYBOARD DRAWER

Features
- Convenient stowage facilities
- Cantilever drawer with ball bearing slides

Dimension: 555 x 395 x 90mm
Weight : 4.86kg



SEI-256K PRINTER BUFFERS

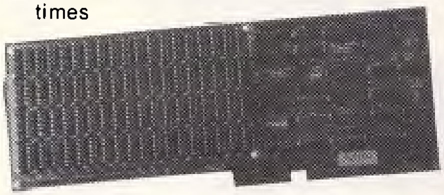
- 256K
- Dual outputs
- DC Adaptor included

GENERAL SPECIFICATIONS:

Construction: Plastic case (Ash color).
Dimensions: 185 x 129 x 50mm.
Weight: 400gr.
Contact Ratings: 100V rms 2 Amp (Switching current 500mA).
Contact Resistance: 100 milliohms
Isolation Resistance: 1.5 x 10^4 megaohms.
Dielectric Strength: 1,000VAC between contacts.
Cross Talk: 10 MHZ 51 dB 500KHZ 78dB.

DIGIS-80286 SPEEDCARD

- Makes your XT perform like an AT
- Runs at 8MHz, Toggle between AT & XT speeds
- Optional 80287 co-processor
- Fits directly into XT slot
- Increase XT processing speed up to 9 times



LP-338 4 MB RAM CARD

- Memory capacity expandable to 4MB
- AT compatible
- Support all popular softwares
- Switch selectable starting address

A&B Switch DCA-1005

A-B SELECT SWITCH

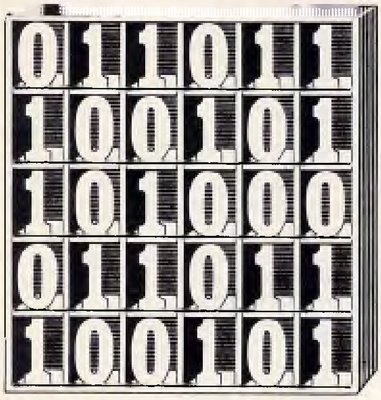
- 2 Computers sharing 1 Printer
- 2 Printers for use on 1 Computer
- 2 RS-232 Device from 1 Computer
- all 25 wires fully supported
- Low cost high efficiency unit

Push Button
PC board construction

Distributors & Dealers Wanted

DIGITAL RESOURCES PTY LIMITED

169 Phillip St., Waterloo, N.S.W. 2017, Australia.
Phone: (02) 690 1268 — 690 1540 Fax: (02) 699 9636 Telex: AA75406



David Barrow presents more documented machine code routines and useful information for the assembly language programmer. If you have a good routine, an improvement or conversion of one already printed, or just a helpful programming hint, then send it in and share it with other programmers. Subroutines for any of the popular processors and computers are welcome but please include full documentation. All published code will be paid for. Send your contributions to Subset, APC, 2nd Floor, 215 Clarence Street, Sydney 2000

Z80 NAMES AND DATES

The five datasheets this month are extracts from the Secret Diary of John Hardman, aged — well, he didn't say.

John hasn't made any underwhelming disclosures about his private life but, fortunately, he has decided to tell everything about how he records and prints all those names and dates in his computerised diary.

NAMES (Datasheet 1) is the semi-intelligent bit from a procedure which John has designed to make the input of names and places a 'user-friendly' operation to keyboard novices. The full program prompts input of a name, giving suitable warnings about the use of the space-bar and enter-key (carriage-return). It then puts NAMES to work sorting out the correct case for each alphabetic character in the input string, presumably on the assumption that anyone who can't type their own name either hasn't yet learnt about big letters or thinks the shift key is there to be pressed at knocking-off time.

The concept behind NAMES is that proper nouns generally consist of lower-case letters but with upper-case initials following any sort of punctuation — space, period, apostrophe, hypen, and so on.

Unfortunately, NAMES hasn't yet learnt that big letters can occur in the middle of Scottish names and that it ought to use little letters for names beginning with a double f.

DATASHEET 1

```
;
;CALL: NAMES       Convert all characters in name string to lower-case
;                  with upper-case initials.
;
;CONCEPT           (System & language independent description)
;Data Structure    STRING. Byte       0: length 0 (empty) to 255 (full).
;                          Bytes 1-255: data bytes.
;Prog. Structure   set upper-case-flag.
;                  WHILE characters remain
;                  {
;                    address next character.
;                    read character.
;                    IF character NOT alpha
;                    [
;                      set upper-case-flag.
;                    :
;                      IF upper-case-flag set
;                      [
;                        write upper-case character.
;                        reset upper-case-flag.
;                      :
;                        write lower-case character.
;                      ]
;                    ]
;                  }
;
;SYSTEM            (System implementation requirements)
;Processor         Z80
;Hardware need     Name string RAM.
;Software need     None.
;
;PROGRAM           (Specific coding and operation details)
;Input state       HL addresses length byte (1st byte) of name string.
;Output state      All registers & flags unchanged.
;                  Name string correctly cased (see Misuse Errors).
;Misuse Errors     The routine will incorrectly case some types of name
;                  e.g., "ffitch-McMillan" will become "Ffitch-Mcmillan".
;Optimisation      Upper-case flag (reg. C) is not reset to 0 to signal

;                  lower-case but is decremented to a non-zero result for
;                  each character. The "flag" must, therefore, have at
;                  least as many "states" as characters in the string.
;Register need     HL
;Location need     Not specific.
;Program Bytes     33
;Stack Bytes       6
;Clock Cycles      Min. (null string): 99. Max. (255-byte name)  25087.
;
;SUBSET CLASS      (Environmental hazard guide)
;*****-   2        Discreet:  YES   Interruptable: YES   Promable: YES
;                  Reentrant: YES   Relocatable:   YES   Robust:   NO
;
;
UCAND    EQU  11011111B       ;All alpha are u.c. if bit 5=0.
LCOR     EQU  00100000B       ;All alpha are l.c. if bit 5=1.
;
NAMES    PUSH AF              ;Save accumulator & flags.      F5
         PUSH BC              ;Save for length & u.c. flag.   C5
         PUSH HL              ;Save string pointer.           E5
         LD   B,(HL)          ;Get string length byte & inc   46
         INC  B               ;for pre-process decrement.     04
;
NAFLAGST LD   C,1             ;Set u.c. flag initially.       0E 01
NACALLP  DJNZ NAREAD          ;While char left, go process.   10 04
;
         POP  HL              ;Restore string pointer,        E1
         POP  BC              ;BC &                           C1
         POP  AF              ;acc. & flags.                  F1
         RET                  ;Exit, name string cased.       C9
;
NAREAD   INC  HL              ;Point to next character and    23
         LD   A,(HL)          ;get for processing.            7E
         AND  UCAND           ;Ensure upper case if alpha.    E6 DF
;
         CP   "A'             ;Test if alphabetic (A-Z) and   FE 41
         JR   C,NAFLAGST      ;if not then don't convert it   38 F0
         CP   "Z"+1           ;but "return" to loop "call" to FE 91
         JR   NC,NAFLAGST     ;set u.c. flag for next char.   30 EC
;

         DEC  C               ;Alpha, so test u.c. flag and   0D
         JR   Z,NAWRITE       ;write u.c. if flag was set.    28 03
         OR   LCOR            ;Else convert to lower case.    F6 20
;
NAWRITE  LD   (HL),A          ;Write alpha back to string     77
         JR   NACALLP         ;and "return" to loop "call".   18 E6
;
```

DATE UPDATE

NEXTDAY, MONTHLEN and LEAPYEAR (Datasheets 2 to 4) form a set which can adjust the date at midnight on continuously running computers with an accurate time interrupt. Alternatively, if you can get your system to save the date automatically when you finish work and switch off (press the shift key?), the routines will calculate the date for you when you switch on in the morning — if you don't take a day off!

NEXTDAY simply increments a set of date variables, but the two subroutines, MONTHLEN and LEAPYEAR, could be used by any program which manipulates dates.

LEAPYEAR calculates the Gregorian correction which came into effect only after the calender reform of 1752 (in England). Since the previous (Julian) calendar celebrated a leap year every four years, including all century closing years, 10 days had to be omitted from the year 1752.

LEAPYEAR is thus valid for English dates only from 1753. Earlier dates may be valid for different European countries which generally put the correction into effect earlier than England. Russia, however, was still using the Julian Calendar, now 13 days adrift, at the time of the October 25th Revolution on 7 November 1917. Australia wasn't using calenders at the time.

DATASHEET 2

```
;
;CALL: NEXTDAY    Update day and date numeric variables by one day.
;
;CONCEPT          (System & language independent description)
;Prog. Structure  IF weekday = 7
;                 [
;                   weekday = 1.
;                 !
;                   weekday = weekday + 1.
;                 ]
;                 IF monthday = monthlength (month, year)
;                 [
;                   monthday = 1.
;                   IF month = 12
;                   [
;                     month = 1.
;                     year = year + 1.
;                   !
;                     month = month + 1.
;                   ]
;                 !
;                   monthday = monthday + 1.
;                 ]
;
;SYSTEM           (System implementation requirements)
;Processor        Z80
;Hardware need    None.
;Software need    Subroutine: MONTHLEN
;                              Returns A = days in month E, year HL.
;
;PROGRAM          (Specific coding and operation details)
;Input state      HL = year.
;                 E = month number (1 to 12 = January to December).
;                 D = month day (1 to 28/29/30/31).
;                 C = week day (1 to 7 = Monday to Sunday).
;Output state     C,D,E,HL = Day and date updated by one day.
;                 Other registers unchanged.
;Misuse Errors    No check for invalid input data.

;Optimisation     None.
;Register need    C D E HL
;Location need    Not specific.
;Program Bytes    27
;Stack Bytes      4 + Subroutine use.
;Clock Cycles     Min: 92, max: 132, + subroutine time.
;
;SUBSET CLASS     (Environmental hazard guide)
;*****-   2       Discreet:  YES   Interruptable: YES   Promable: YES
;                 Reentrant: YES   Relocatable:   YES   Robust:   NO
;
;
NEXTDAY  PUSH AF              ;Save working reg & flags.      F5
         INC  C               ;Inc day of week (1 to 7)       0C
         BIT  3,C             ;but if 8, reset to 1.          CB 59
         JR   Z,NDMDAY        ;                               28 02
         LD   C,1             ;                               0E 01
;
NDMDAY   CALL MONTHLEN        ;A = days, month E, year HL.    CD lo hi
         CP   D               ;Compare with current monthday  BA
         JR   NZ,NDINCD       ;and skip if not last day.      20 0A
;
         LD   D,0             ;Else clear (for later INC).    16 00
         LD   A,E             ;A = current month (1 to 12)    7B
         CP   12              ;Test if last month,            FE 0C
         JR   NZ,NDINCM       ;skip if not.                   20 02
;
         LD   E,D             ;Else clear (D=0) and           5A
         INC  HL              ;increment year number.         23
;
NDINCM   INC  E               ;Increment month.               1C
;
NDINCD   INC  D               ;Increment day of month.        14
         POP  AF              ;Restore and                    F1
         RET                  ;Exit, next day's date correct. C9
;
```

DATASHEET 3

```
;
;CALL: MONTHLEN   Return number of days in given month of given year.
;
;CONCEPT          (System & language independent description)
;Prog. Structure  IF month = 2 AND year = leapyear
;                 [
;                   monthlength = 29.
;                 !
;                   monthlength = (monthdays-table-base + month).
;                 ]
;
;SYSTEM           (System implementation requirements)
;Processor        Z80
;Hardware need    None.
;Software need    Subroutine: LEAPYEAR returns Z=1 if HL = leapyear.
;
;PROGRAM          (Specific coding and operation details)
;Input state      HL = year.
;                 E = month number (1 to 12 = January to December).
;Output state     A = number of days in month E, year HL.
;                 F changed. Other registers unchanged.
;Misuse Errors    No check for month number ) 12.
;Optimisation     None.
;Register need    HL E AF
;Location need    Anywhere in memory. Not relocatable because of data.
;Program Bytes    35 (code: 23. appended look-up table: 12)
;Stack Bytes      2 + subroutine use.
;Clock Cycles     month () 2: 97.
;                 month = 2:  leap year:     53 + subroutine time.
;                 month = 2:  not leap year: 121 + subroutine time.
;
;SUBSET CLASS     (Environmental hazard guide)
;-***--   2       Discreet:  NO    Interruptable: YES   Promable: YES
;                 Reentrant: YES   Relocatable:   NO    Robust:  . NO
;
;
MONTHLEN LD   A,E             ;Test for current month is      7B
         CP   2               ;February.                      FE 02
         JR   NZ,MLREADTM     ;Skip if not, else              20 06
;
         CALL LEAPYEAR        ;test for a leapyear.           CD lo hi
         LD   A,29            ;Set A=29 for if leapyear and   3E 1D
         RET  Z               ;exit, days correct, if it is.  C8
;
MLREADTM PUSH HL              ;Save HL for use as pointer to  E5
         LD   HL,MLTAB-1      ;length table (index 1 to 12).  21 lo hi
         LD   A,D             ;Save D in A and clear D as     7A
         LD   D,0             ;high order byte of 16-bit add  16 00
         ADD  HL,DE           ;of month as table index.       19
         LD   D,A             ;Restore D from A.              57
         LD   A,(HL)          ;Read days in month E.          7E
         POP  HL              ;Restore HL and exit, days      E1
         RET                  ;correct for months 1 to 12.    C9
;
;...Table of days in each month.
;
MLTAB    DEFB 31,28,31,30     ;Jan, Feb (non-LP), Mar, Apr,   1F 1C 1F 1E
         DEFB 31,30,31,31     ;May, Jun, Jul, Aug,            1F 1E 1F 1F
         DEFB 30,31,30,31     ;Sep, Oct, Nov, Dec.            1E 1F 1E 1F
;
```

DATASHEET 4

```
;
;CALL: LEAPYEAR   Test year number for leapyear.
;
;CONCEPT          (System & language independent description)
;Prog. Structure  leapyear = F.
;                 IF year is a multiple of 4
;                 [
;                   leapyear = T.
;                   IF year is a multiple of 100
;                   [
;                     leapyear = F.
;                     IF year is a multiple of 400
;                     [
;                       leapyear = T.
;                     ]
;                   ]
;                 ]
;
;SYSTEM           (System implementation requirements)
;Processor        Z80
```

KB-5161
KB-5061
(RT LAYOUT, IBM PC, XT/AT SWITCHABLE)

101 KEYS FCC ID: E8H5IKKB-5161/E8H5IKKB-5061

Looking for FCC quality products?

We have all and we do it all!

KB-5160AT
KB-5060AT
FCC ID: E8H5IKKB-5160AT

84 KEYS

KB-5152AT

FCC ID: E8H5IKKB-5152AT 100 KEYS

KEYBOARD FEATURES:

- FCC Approved
- ARC profile design
- IBM PC XT/AT compatible or switchable
- Mechanical key switch/ capacitive key switch
- Embossed surface
- Double-shot molded key caps
- Operation life cycle: 20×16^6
- Special version available
- Cluster LED indicators

Your written inquiries, or visits to our factory, are most welcome. Save yourself time and money by contacting us, since we're not only manufacturers, but also experienced exporters supplying the best quality products at the most competitive prices.

MODEM: KM-2400
- BELL 103/212A, CCITT V. 22/V. V.22 BIS compatible.
*Full or half duplex.

Manufacturer & Exporter,
CHICONY ELECTRONICS CO., LTD.
7/F, No. 35, kuang Fu S. Rd., Taipei, Taiwan, R.O.C.
Tel:(02)764-7277 Telex:14465 CHICONY. Fax:886-2-761-7237

Chicony

IBM PC, XT, AT are registered trademarks of International Business Machines Corp.

```
;Hardware need    None.
;Software need    Subroutine: DIVMODHD performs HL rem DE := HL/DE.
;                             flags out: Z=1:  quotient HL = 0.
;                                        Cy=1: remainder DE = 0.
;
;PROGRAM          (Specific coding and operation details)
;Input state      HL = year number.
;Output state     Z=1: year HL is a leapyear.
;                 Z=0: year HL not a leapyear.
;                 F changed. No other registers changed.
;Misuse Errors    No check for dates preceding the Gregorian calendar
;                 reform (1752 in England but different elsewhere).
;Optimisation     Uses the result of previous divisions (D=0) when
;                 reloading the divisor (DE).
;Register need    HL F
;Location need    Not specific.
;Program Bytes    30
;Stack Bytes      6 + subroutine use.

;Clock Cycles     Min: 95, max: 159, plus subroutine time.
;
;SUBSET CLASS     (Environmental hazard guide)
;*****-   2       Discreet:  YES   Interruptable: YES   Promable: YES
;                 Reentrant: YES   Relocatable:   YES   Robust:   NO
;
;
LEAPYEAR PUSH DE              ;Save DE for use as divisor.    D5
         PUSH HL              ;Save year number as dividend.  E5
;
         LD   DE,4            ;/4. If year is not a           II 04 00
         CALL DIVMODHD        ;multiple of 4                  CD lo hi
         JR   NC,LYFALSE      ;then not a leapyear.           30 10
;
         LD   E,25            ;/4 then /25 = /100. If year    IE 19
         CALL DIVMODHD        ;is multiple of 4 but NOT of    CD lo hi
         JR   NC,LYTRUE       ;100 then it is a leapyear.     30 07
;
         LD   E,4             ;/100 then /4 = /400. If year   1E 04
         CALL DIVMODHD        ;is multiple of 100 but not     CD lo hi
         JR   NC,LYFALSE      ;of 400 then not a leapyear.    30 02
;
LYTRUE   LD   E,-1            ;Set Z for leapyear on "INC E". 1E FF
;
LYFALSE  INC  E               ;Reset Z unless E = -1.         1C
         POP  HL              ;Restore year number and        E1
         POP  DE              ;DE, then                       D1
         RET                  ;exit, Z = 1 if HL a leapyear.  C9
```

DATE FORMATTER

PRNTDATE (Datasheet 5) outputs a user-friendly date format, converting from the unfriendly binary numbers used by the date adjustment routines to a week day name, month day number with suffix, month name and year number.

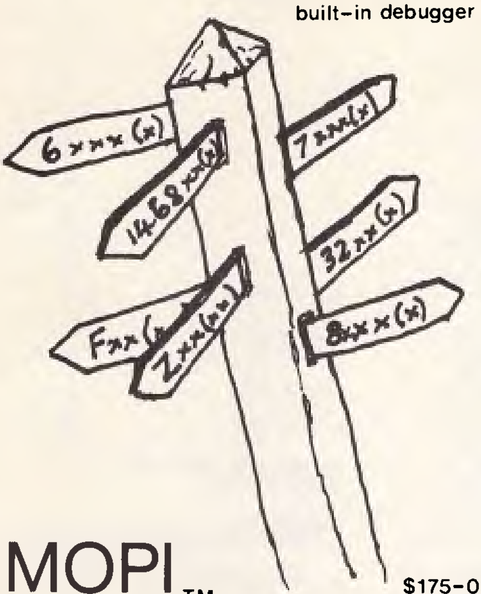
The routine needs three subroutines to output indexed strings, ASCII characters and the decimal equivalent of a 16-bit binary number (magnitude 0 to 65535). The Class requirement given against each subroutine in 'Software need' refers to the minimum needs of PRNTDATE: a program using PRNDATE would require higher Class standards of all lower level routines.

DATASHEET 5

```
;
;CALL: PRNTDATE   Output day and date to currently assigned peripheral
;                 device, converting from binary numerical format to
;                 standard mixed name-string and decimal number format.
;                 (e.g. "05 0A 11 07C2" to "Friday 17th October 1986")
;
;CONCEPT          (System & language independent description)
;Data Structure   STRING. Header:     none.
;                         Element:    byte, non-null ( >00H).
;                         Length:     variable >=0.
;                         Terminator: null (00H).
;                 LIST.   Header:     none.
;                         Element:    STRING.
;                         Length:     variable > 0.
;                         Terminator: null (00H).
;Prog. Structure  LIST-OUTPUT (days-list, weekday).
;                 LIST-OUTPUT (days-list, 0).
;                 CHAR-OUTPUT (<SPACE>).
;                 DECIMAL-OUTPUT (monthday).
;                 date = monthday.
;                 IF date > 20 AND date < 31
;                 [
;                   date = date - 20.
;                 ]
;                 IF date = 3I
;                 [
;                   date = 1.
;                 ]
;                 IF date > 4
;                 [
;                   date = 4.
;                 ]
;                 LIST-OUTPUT (date-suffix-list, date).
;                 CHAR-OUTPUT (<SPACE>).
;                 LIST-OUTPUT (months-list, month).
;                 CHAR-OUTPUT (<SPACE>).
;                 DECIMAL-OUTPUT (year).
;
;SYSTEM           (System implementation requirements)
;Processor        Z80
;Hardware need    Peripheral device for output (VDU, printer, etc.).
;Software need    Subr: PRLSTSTR: Output, to assigned peripheral, string
;                                 (A) in list beginning at address HL.
;                                 (Class requirement: *----*)
;                 Subr: PRVALDEC: Output, to assigned peripheral,
;                                 decimal string converted from binary
;                                 HL, suppressing leading zeros.
;                                 (Class requirement: *----*)
;                 Subr: PRCHARA:  Output, to assigned peripheral, ASCII
;                                 character in A.
;                                 (Class requirement: *----*)
;
;PROGRAM          (Specific coding and operation details)
;Input state      HL = year.
;                 E = month number (I to 12 = January to December).
;                 D = month day (1 to 28/29/30/31).
;                 C = week day (1 to 7 = Monday to Sunday).
;Output state     Day and date output. All registers unchanged.
;Misuse Errors    No check for invalid date (e.g. February 31st) or out
;                 of range data which will exceed list lengths.
;Optimisation     Day names are output as root + "day" to save 17 bytes.
;Register need    C D E HL
;Location need    Anywhere in memory. Not relocatable because of data.
;Program Bytes    212 (code: 72. appended data: 39 + 13 + 88 = 140).
;Stack Bytes      6 + subroutine use.
;Clock Cycles     Not given.
;
;SUBSET CLASS     (Environmental hazard guide)
;****--   2       Discreet:  YES   Interruptable: YES   Promable: YES
;                 Reentrant: YES   Relocatable:   NO    Robust:   NO
;
;
PRNTDATE PUSH AF              ;Save AF.                         F5
         PUSH HL              ;Save year for pointer use.       E5
         LD   A,C             ;Index day name stem,             79
         LD   HL,DAYLST       ;Address day name list,           2I lo hi
         CALL PRLSTSTR        ;and output day name stem.        CD lo hi
         XOR  A               ;Index "day" in day name list     AF
         CALL PRLSTSTR        ;and append "day" to stem,        CD lo hi
         LD   A," "           ;followed by a space.             3E 20
         CALL PRCHARA         ;                                 CD lo hi
;
         LD   L,D             ;Get monthday from D              6A
         LD   H,0             ;into HL and output as            26 00
         CALL PRVALDEC        ;decimal string.                  CD lo hi
;
         LD   A,D             ;Get monthday as suffix index.    7A
         CP   21              ;If date 1 to 20 then skip to     FE 15
         JR   C,PDSUFFTH      ;simple "th" suffix adjust.       38 08
         SUB  20              ;Else 21 to 31 maps to 1 to 11.   D6 14
         CP   11              ;21 to 30 mapped to 1 to 10.      FE 0B
         JR   NZ,PDSUFFTH     ;need no more mapping but 31      20 02
         LD   A,1             ;maps on to 1 for "st" suffix.    3E 01
;
PDSUFFTH CP   5               ;Dates 1 to 4 index four          FE 05
         JR   C,PDSUFFPR      ;suffixes, so skip, above 4       38 02
         LD   A,4             ;adjust to 4 for "th" suffix.     3E 04
;
PDSUFFPR LD   HL,SUFFXLST     ;Address suffix list, index A,    21 lo hi
         CALL PRLSTSTR        ;and output correct suffix,       CD lo hi
         LD   A," "           ;followed by a space.             3E 20
         CALL PRCHARA         ;                                 CD lo hi
;
         LD   A,E             ;Index month name,                7B
         LD   HL,MONTHLST     ;Address month list and           21 lo hi
         CALL PRLSTSTR        ;output month name,               CD lo hi
         LD   A," "           ;followed by a space.             3E 20
         CALL PRCHARA         ;                                 CD lo hi
;
         POP  HL              ;Restore year and output          E1
         CALL PRVALDEC        ;as decimal string.               CD lo hi
         POP  AF              ;Restore and                      F1
         RET                  ;Exit, day & date output.         C9
;
```

Take any path with MOPI – the first assembler to be able to generate 8,16 or 32 bit machine code.

A fully professional system; comprehensive manual.
automatic linkage.
built-in debugger etc.



MOPI™

$175-00
(p&p incl.)

A TRUE UNIVERSAL ASSEMBLER.

Distributed by pTIZAN Computer Services Pty. Ltd.
Box 69, BELCONNEN, A.C.T. 2616 Ph.(062)586823

EASTCOM

We like to think we offer more than great computers. We also offer great Service and Support. Why not call in and talk to us, we're not only interested in your money we're interested in you.

At Eastcom we sell components and consumables. At the moment we have floppy discs on special, a packet of 10 for $20.00. Our Eastcom PC 640k, Japanese components, color graphics cards, multi I/O card, and 2 x 360k Japanese drives for $1799 also RGB color monitors from $650 and 20 megabyte hard drives from $950.

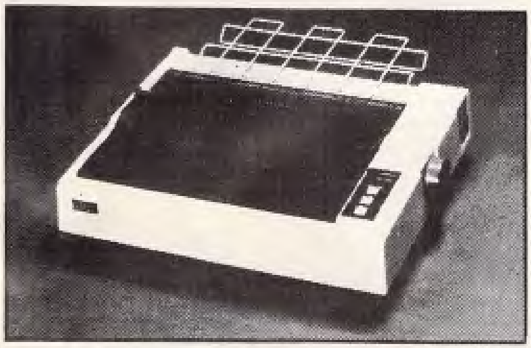
CALL US ON 03 288 3611
OR 03 288 3107

EASTCOM
168 ELGAR ROAD,
BOX HILL SOUTH 3126

Eastcom Bulletin Board now on-line.
Phone **288 0775**

Sakata DOT MATRIX PRINTERS

Your Personal Computer Deserves the Unequalled Printer Quality of Sakata.



SP-1200 plus

The High Reliability SP-1200 plus

- Fast and Neat, 120cps
- Excellent Near Letter Quality Mode
- Numerous modes, fonts and pitches
- Width from 80 column (PICA) to 136 column (CONDENSED)
- Very shart BIT IMAGE graphics
- Adjustable sprocket and friction feed
- IBM-PC command compatible

only **$525** including Sales Tax

Also available

SP-1500	180cps, 80 column, NLQ	$779
SP-5500	180cps, 136 column, NLQ	$1015

FULL
12 MONTH
WARRANTY

SOLE AUSTRALIAN AGENTS
EMONA COMPUTERS PTY LTD

86 PARRAMATTA RD., CAMPERDOWN, N.S.W. 2050. PH. (02) 519 3933

RamPage

AMSTRAD PC1512

The IBM compatible you can trust

At last, the IBM compatible from AMSTRAD. And it is a winner. Backed by AWA, with the reliability you expect from AMSTRAD, the PC1512 is much faster than the IBM PC. Comes complete with GEM, GEM PAINT & MOUSE

From $1500.00

From $2699 with Tandon 21MB hard card

BY COMMODORE® AMIGA™

PERSONAL COMPUTER

Come and see the Amiga experts for the perfect Christmas gift!

The Amiga could be called the world's first personal supercomputer. It runs upwards of 10 times the speed of any rivals. It adds hardware animation, video input and stereo sound synthesis to the icon & mouse user interface. Put simply, the Amiga does things other micros can't do.

Only $2495.00

RamPage
COMPUTERS
the business solution

Shop 13
300 Toorak Road
South Yarra 3141
phone (03) 241 3031

Please send information on:

- ☐ Spectrum
- ☐ Amiga
- ☐ Amstrad PC1512
- ☐ Atari ST
- ☐ Amstrad PCW
- ☐ BBC
- ☐ Sinclair QL
- ☐ Philips multi user

Name ....

Address ....

....

```
;...Lists of daynames, date suffixes and monthnames.
;
DAYLST   DEFM "day"          ;Index 0                      64 61 79 20
         DEFB 0              ;String terminator.           00

         DEFM "Mon"          ;1                            4D 6F 6E
         DEFB 0              ;                             00
         DEFM "Tues"         ;2                            54 75 65 73
         DEFB 0              ;                             00
         DEFM "Wednes"       ;3                            57 65 64 6E
                                                           65 73
         DEFB 0              ;                             00
         DEFM "Thurs"        ;4                            54 68 75 72
                                                           73
         DEFB 0              ;                             00
         DEFM "Fri"          ;5                            46 72 69
         DEFB 0              ;                             00
         DEFM "Sat"          ;6                            53 61 74
         DEFB 0              ;                             00
         DEFM "Sun"          ;7                            53 75 6E
         DEFB 0              ;End of DAYLST.               00
;
SUFFXLST DEFB 0              ;Index 0 terminator.          00
         DEFM "st"           ;1 (1st, 21st, 31st)          73 74
         DEFB 0              ;                             00
         DEFM "nd"           ;2 (2nd, 22nd)                6E 64
         DEFB 0              ;                             00
         DEFM "rd"           ;3 (3rd, 23rd)                72 64
         DEFB 0              ;                             00
         DEFM "th"           ;4 (4th - 20th, 24th - 30th)  74 68
         DEFB 0              ;End of SUFFXLST.             00
;
MONTHLST DEFB 0              ;Index 0 terminator.          00
         DEFM "January"      ;1 (Months numbered 1 - 12    4A 61 6E 75
                                                           61 72 79
         DEFB 0              ;   require a null string     00
         DEFM "February"     ;2  at index 0 for correct    46 65 62 72
                                                           75 61 72 79
         DEFB 0              ;   indexing of list.)        00
         DEFM "March"        ;3                            4D 61 72 63
                                                           68
         DEFB 0              ;                             00
         DEFM "April"        ;4                            41 70 72 69
                                                           6C
         DEFB 0              ;                             00

         DEFM "May"          ;5                            4D 61 79
         DEFB 0              ;                             00
         DEFM "June"         ;6                            4A 75 6E 65
         DEFB 0              ;                             00
         DEFM "July"         ;7                            4A 75 6C 79
         DEFB 0              ;                             00
         DEFM "August"       ;8                            41 75 67 75
                                                           73 74
         DEFB 0              ;                             00
         DEFM "September"    ;9                            53 65 70 74
                                                           65 6D 62 65
                                                           72
         DEFB 0              ;                             00
         DEFM "October"      ;10                           4F 63 74 6F
                                                           62 65 72
         DEFB 0              ;                             00
         DEFM "November"     ;11                           4E 6F 76 65
                                                           6D 62 65 72
         DEFB 0              ;                             00
         DEFM "December"     ;12                           44 65 63 65
                                                           6D 62 65 72
         DEFB 0              ;End of MONTHLST.             00
;
```

I've always wanted to be a home computer

If you buy only one PC Publication this year you can't afford to miss

THE APC BUYERS GUIDES TO HARDWARE & SOFTWARE

Only **$7.50** per guide

Finding the time and then the relevant information that is succinct, and accurate, on the state of the PC and microcomputer market was a near impossible task.

That was before Australian Personal Computer magazine decided to produce Australia's most comprehensive buyers guide. An indepth summary of what's available, what's new, and what's coming in hardware, software and communications.

Easy indexes and cross-referencing. Accurate comparisons. Lead articles for each section that inform and challenge your perceptions of particular subjects. The "Hardware Guide" examines micro & PC processors, monitors, printers, drives, communication devices & all peripherals, while The "Software Guide" will be the widest collection of data on software applications from traditional to creative, including the rapidly expanding graphics area. Each guide for a mere $7.50.

Once you've read the APC Buyers Guide you'll be equipped to make even better purchasing decisions. So lash out and make the cheapest micro investment for your future, this year.

Available direct from the publisher. Credit Cards and cheques accepted. Phone Sydney 264 1266, Melbourne 531 8411.

Australian Personal Computer

Phone Sydney 264 1266, Melbourne 531 8411

The ~~most~~ only comprehensive guide to the Australian microcomputer market.

Published March 1987

AVAILABLE DIRECT FROM THE PUBLISHER

Please reserve my advance copy

☐ 1987 APC Buyers Guide to Hardware	$7.50
☐ 1987 APC Buyers Guide to Software	$7.50
☐ Both Buyers Guides	$14.50

Name:____________________
(Please Print)
Address____________________
____________________ P'code:__________
I enclose a cheque for $ (Postage and handling $3.00) Still $3.00 postage if you purchase both.
OR charge to my credit card:____________________ Date:__________
(Describe type)
☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Signature:__________

Mail to: Australian Personal Computer
Level 2, 215 Clarence, SYDNEY. NSW. 2000.

the UN 608

NUMBERS COUNT

Mike Mudge looks at the importance of the Fermat Quotient.

Definition. Two integers a and b are said to be congruent modulo a third integer c if, and only if, c is a factor of $a-b$.

This is written $a \equiv b \pmod{c}$ or $a \equiv b(c)$.

For example:
$23 \equiv 17 \pmod{3}$ since $23-17=6=2\times3$,
$16688 = 96 \pmod{17}$ since
$16688-96=16592=976\times17$.

Consider the congruence:
$a^{N-1} \equiv 1 \pmod{N^2}$ . . . (1)
This was investigated, for odd N and a=2,3,4 ... 99 by DH and Emma Lehmer from 1960 to 1967. Their investigation extended earlier work including that of Fröberg, Kravitz, Pearson, Riesel, Hausner & Sachs and Kloss.

There are found to be two distinct problems; the first in which N is restricted to prime values, p=3,5,7,11,13,17. . . while the second considers composite(non-prime) values of N.

Readers should be aware that the Fermat Quotient is closely connected with Fermat's Last Theorem — through the criterion of Wieferich (1909)-and with Catalan's Conjecture through the work of Inkeri (1964); for these reasons alone it is worthy of both theoretical and empirical study.

(i) Some results when N=p a prime
In 1962 the highest published search limit for a=2 was 200183 due to Pearson; by 1963 the Lehmers had searched to 2^{22} for $2 \leqslant a \leqslant 10$ and found the new solutions p=1006003 for a=3 and p=534851 for a=6, also p=3152573 for a=6.

In 1964 Riesel extended a to 150 finding all solutions $p<500000$ for $2 \leqslant a \leqslant 10$ and $p<10000$ for $11 \leqslant a \leqslant 150$.

In 1965 Kloss published solutions including p=1747591 for a=13, p=2481757 for a=23 and p=1025273 for a=41.

The latest results known to the author are due to Brillhart, Tonascia and Weinberger and include the search limits shown in Fig 1.

Their discoveries include: p=53471161 for a=5, p=56598313 for a=10, p=1284043 for a=18 and p=63061489 for a=19.

The totality of known solutions to $a^{p-1} \equiv 1 \pmod{p^2}$ where p is prime are shown in Fig 2.

(ii) Some results when N is composite (non-prime)
There are theoretical results providing a strong characterisation of the primes which divide a composite solution of congruence (1) above.

These are to be found in AOL Atkin's and BJ Birch's *Computers in Number Theory*, Academic Press 1971; but they are beyond the scope of this article.

Known solutions of $a^{N-1} \equiv 1 \pmod{N^2}$, N odd and composite are shown in Fig 3.

Readers are invited to investigate the Fermat Quotient, above, determining all possible solutions for N both prime and composite for a specified set of values of a: reproducing as many as possible of the particular results quoted. It is hoped that such investigations will lead to some statement regarding the prime factors of composite N solutions.

The results of these investigations, which must arrive by 1 March 1987, may be submitted to Mike Mudge, c/- *APC*, 2nd Floor, 215 Clarence Street, Sydney 2000. It would be appreciated if such submissions contained a brief summary of results; together with thoughts relating to this problem, in a form suitable for publication in *APC*.

Submissions will be judged using suitably vague criteria, and a prize will be awarded to the 'best' contribution received. Please note that submissions can only be returned if a suitable stamped addressed envelope is provided.

Mike Mudge welcomes correspondence on any subject within the areas of number theory and other computational mathematics. Particularly welcome are suggestions for future 'Numbers Count' articles: all letters will be answered after a sufficient length of time!

July review: PAPs

The state of the art regarding Primes in Arithmetic Progression (PAPs) is to be found in the paper by Paul Pritchard, *Mathematics of Computation*, volume 45, number 171, July 1985, pages 263-267, 'Long Arithmetic Progressions of Primes: Some Old, Some New'. This contains the results of 14000 hours of computer time on a DEC VAX-11/780 (or rather two such systems) and reports that no PAPs of length greater than 19 are known. Three is also an interesting comparison of statistically predicted and experimentally observed PAPs of given length.

Tables, 1, 2 and 3 are produced from the above paper in the hope of encouraging interested readers to experiment in this field.

The July prize-winner, in a problem which attracted an encouraging and varied response, is Hugh Spence. Hugh presented detailed flow charts in addition to his Pascal coding, run times and output. I am convinced that Hugh, together with fellow PAP enthusiasts would benefit from a sight of the paper referred to above.

a	2	3	5	6,7,10,11,12,13	14,15,17,18,19,20	21,34	29,47,50
p	3.10^9	2^{30}	2^{29}	2^{28}	2^{27}	2^{29}	2^{28}

Fig 1

a	p	a	p
2	1093, 3511	3	11, 1006003
15	29131	17	3, 46021, 48947

Fig 2

a	N	a	N	a	N
26	15, 1065	68	133	80	9
82	9, 45	99	35,65,	146	91
			1729	148	451

Fig 3

'No, Jenkins, that's not what it means!'

Coloured Computer Paper

Now available in 3 different colours, yellow, pink and blue.

11 × 9½/70 WORD PROC. PAPER	
W250 Pack	250 sheets
W500 Pack	500 sheets
W1000 Pack	1000 sheets

Also available in boxes of 2,000 & 2,500

A4 WORD PROC. PAPER	
A-4 250 Pack	250 sheets
A-4 500 Pack	500 sheets
A-4 1000 Pack	1000 sheets

Also available in boxes of 2000

(Also pre printed STD inv/stat formats.
All prices include S.T. Plus packing & postage)

11 × 15 PLAIN OR B.H.S	
LP 250 Pack	250 sheets
LP 500 Pack	500 sheets
LP 1000 Pack	1000 sheets

Also available in boxes of 2,500

COMPUTER ADDRESS LABELS	
37 x 102	2000 labels
24 x 89	2000 labels

Also available in boxes of 10,000

11 x 9½ Coloured computer paper	
One Colour Pack	250 sheets
Candy Pack	400 sheets

(100 sheets each colour, plus white)

COMPUTER PRINT & PAPER CO. PTY. LTD.

In mini
& micro packs
available from leading
computer stores now.

PHONE (03) 553 2100

DEALER ENQUIRIES WELCOME

141 Herald St,
Cheltenham 3192
P.O. Box 773, Cheltenham
All prices R.R.P.

Are You Looking for PC/AT Systems with Mini Sizes? Yes, We Have COMPACT-AT systems to Your Need. It's Better!

SYSTEM-CATMH

- Mainboard 6/8 MHz CPU 80286 512K RAM (expandable to 1MB on board).
- 20MB HDD • 1.2MB FDD • HDD + FDD controller card • M/G/P card.
- 2 serial + 1 parallel card • power supply • keyboard

System configuration change available on request.

We sell:

SYSTEMS : PC/XT 4.77 MHz, 4.77/8 MHz, PC/AT 6/8 MHz, COMPACT-AT 6/8 MHz.

PARTS : Main boards, Add-on cards, Power supplies, HDD, FDD, Streamer drive, Keyboards, Cases, Monitors, Printers,...

CARDS : AT-Mainboards, XT-Mainboards, 2S/1P Card, 4-Serial Card, Serial Card (1P or 2P), HDD + FDD Ctrl Card, HDD Ctrl Card, 1.2MB + 360KB FDC, 1.2MB FDC, 360KB FDC, EGA Card, M/G/P Card, C/G/P card, RGB Card, Multifunction Card (2S + 1P + Game + RTC + FDC), 384K MFC, 516K RAM Card, 2.5MB RAM Card, 3MB MFC, EPROM Writer, AD/DA Card, IEEE488 Card, Parallel Printer Card,... Plus NOVELL Arc-net Card, 8 Port Active Hub, etc.

Your best choice with a reliable supplier from Taiwan, contact immediately.

Dennison Industrial Co., Ltd. P.O. Box 18—109,Taipei, Taiwan R.O.C. FAX: (02)7137479 TLX: 29951 DENNISON

PC PROMISE

TRY BEFORE YOU BUY $10 OFFER

THE NEW STANDARD IN RELATIONAL DATABASE MANAGEMENT SYSTEMS

"Best buy in Databases"
Which Computer — August 86.

"A range of features far beyond what businesses usually get for such a price"
PC WORLD — May 1986

"Unusually easy to use in relation to it's power — excellent value for money"
PC USER — April 86

"PC PROMISE — it's low cost, minimal system requirements & two way file transfer capabilities make it ideal"
PC Magazine — Feb 86

JOIN AMSNET AND SAVE ON ALL FUTURE PURCHASES
$25 MEMBERSHIP
075-53 1734

Australian Microcomputer and Software NETwork

* No programming language required. * Will run on one floppy disk. * Variable length fields — no wasted disk space. * 250 fields per record * 32000 records per file * 1800 characters per field. * File security by password. * Screens can be defined as windows. * Full colour support.

STILL NOT SURE?

Try out a demonstration disc of PC PROMISE. Send a $10 cheque, M/O or Bankcard No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ **Exp date (/ /)**

To:
AMSNET International Pty. Ltd., 49 Riversdale Road,
OXENFORD, QLD 4210

Please send me a Demo Disk of PC PROMISE on 5.25" IBM format to:

(Mr)(Mrs)(Ms): .... **Phone:** ....

Address: ....

City/Town: .... **Post Code:** ....

Signed: .... **Date:** ....

TAIWAN'S BIGGEST PROFESSIONAL CABINET MAKER

We have all and we do it all!

An established and well–known manufacture of top–quality products that has built a solid reputation for OEM production to the most exacting specifications. Ling Yih produces housing for your motherboards and all of its peripherals.

From stamping and shapping to insulating and painting, Ling Yih controls every step of the manufacturing process. Every month, hundred thousand of computer housings roll off of our automated assembly line. And you have 20 different bezels to choose from. Because, as Taiwan's largest cabinet maker, we do it all, we can offer you the highest quality at the most reasonable price.

Contact us today.
We deliver!

LING YIH CO., LTD.
9F-3, 57, Fu–Hsing N. RD., Taipei, Taiwan, R.O.C.
Tel: (02)771-7166 Fax: (02)711-3506
Telex: 20232 LINGYIH

NUMBERS COUNT

m	PAP of length m with minimal last term (k=0,1,2. . ., $m-1$)	last term	estimated last term
2	2,3	3	2
3	3,5,7	7	2
4	5,11,17,23	23	2
5	5,11,17,23,29	29	29
6	$7+30k$	157	92
7	$7+150k$	907	497
8	$199+210k$	1669	1406
9	$199+210k$	1879	5086
10	$199+210k$	2089	24310
11	$110437+13860k$	249037	177300
12	$110437+13860k$	262897	829800
13	$4943+60060k$	725663	5582000
14	$31385539+420420k$	36850999	2.332×10^{7}
15	$115453391+4144140k$	173471351	1.137×10^{8}
16	$53297929+9699690k$	198793279	6.793×10^{8}
17	$3430751869+87297210k$	4827507229	5.774×10^{9}
18	$4808316343+717777060k$	17010526363	3.303×10^{10}
19	$8297644387+4180566390k$	83547839407	2.564×10^{11}
20	?	?	1.261×10^{12}

Table 1 The known PAPs with minimum last term

n	common difference	first term	last term	discovery
12	30030	23143	353473	VA Golubev, 1958 (see [8])
12	13860	110437	262897	E Karst, 1967 ([8])
13	60060	4943	725663	VN Seredinskij, 1963 (see [8])
14	223092870	2236133941	5136341251	SC Root, 1969 (see [7])
14	420420	31385539	36850999	PA Pritchard, 1983
15	223092870	2236133941	5359434121	SC Root, 1969 (see [7])
15	4144140	115453391	173471351	PA Pritchard, 1983
16	223092870	2236133941	5582526991	SC Root, 1969 (see [7])
16	9699690	53297929	198793279	S Weintraub, 1976 ([12])
17	87297210	3430751869	4827507229	S Weintraub, 1977 ([13])
18	9922782870	107928278317	276615587107	PA Pritchard, 1981 ([11])
18	717777060	4808316343	17010526363	PA Pritchard, 1983
19	4180566390	8297644387	83547839407	PA Pritchard, 1984

Table 2 Some PAPs and their discoverers

length	first term	common difference	last term
18	4808316343	717777060	17010526363
19	8297644387	4180566390	83547839407
18	64158606367	2735312580	110658920227
18	2518035911	7536659130	130641241121
18	115936060313	3103900800	168702373913
18	98488875263	5169934770	186377766353
18	170263333103	5063238180	256338382163
18	107928278317	9922782870	276615587107
18	51565746467	13889956080	287694999827

Table 3 The known PAPs of length at least 18

MICROCHESS

A chess game where neither program really knows what it is doing is the subject of this month's column, annotated by Kevin O'Connell.

This month's game is somewhat different, in that it is what might reasonably be described as a typical encounter between two programs; that is to say that neither program really knows what it is doing but nonetheless each manages to play remarkably well in patches.

The provenance of each of the two programs is quite interesting. Vaxchess

MICROCHESS

is basically a mainframe implementation of a microcomputer program. To my knowledge, this is the first time that a micro program has been converted to run on a mainframe.

The Lachex program, meanwhile, emanates from work at the research laboratories in Los Alamos (which are better known for work on nuclear weapons' research and, in particular, the development and testing of the first atomic bomb).

There is certainly more than one move in the game that explodes with a force not dissimilar to that original Los Alamos test. The game was played in the third round of the 5th World Computer Championship in Cologne earlier this year.

White: Vaxchess. Black: Lachex. Opening: Queen's Gambit Declined.

1 d2–d4 d7–d5
2 c2–c4 e7–e6
3 Nb1–c3 Ng8–f6
4 Bc1–g5 Nb8–d7
5 e2–e3 c7–c6
6 Ng1–f3 Qd8–a5
7 c4xd5 Nf6xd5
8 Qd1–d2 Bf8–b4
9 Ra1–c1 h7–h6

So far, so much book theory. Now 10 Bg5–h4 is the normal move.

10 Bg5–f4 O–O

10 ... Nd5xf4 gives Black at least equality, although the way the game goes he gets a lot more.

11 Bf4–g3 c6–c5

With a very useful pin against the white knight on c3, Black proceeds to free his game and take the initiative.

12 Bf1–d3 f7–f5
13 O–O
13 ... c5xd4
14 e3xd4?

This loses a piece. 14 Nf3xd4 was necessary. Then 14 ... e6–e5 (intending f5–f4) would not succeed in winning anything because of 15 Nd4–b3 when White, threatening Bd3–c4, stands much better.

14 ... f5–f4
15 Qd2–e1 Nd7–f6!

It is important to hang on to the e-pawn.

16 Bg3–h4 g7–g5
17 Bh4xg5 h6xg5
18 Qe1–e5

18 Nf3xg5 is weaker: 18 ... Nd5xc3 19 b2xc3 Qa5xg5! 20 c3xb4 f4–f3 21 g2–g3 Qg5–g4 and there is no good answer to the threat of Qg4–h3–g2.

18 ... Nd5xc3
19 b2xc3 Bb4xc3
20 Qe5xa5 Bc3xa5
21 Rc1–c5 Ba5–b4

White, though he will get a pawn for it, is a whole piece down.

22 Rc5–e5

A strange decision, since 22 Rc5xg5+ immediately regains one pawn and starts to build some real pressure against the black king.

22 ... g5–g4
23 Re5–g5+ Kg8–f7
24 Nf3–e5+ Kf7–e8
25 Rf1–c1

Now 25 Ne5xg4 Nf6xg4 26 Rg5xg4 e6–e5 would let Black regain the pawn.

25 ... Ke8–d8
26 Rg5–g7 Bb4–a3

This just loses time. I much prefer 26 ... Bc8–d7, intending Ra8–c8. Having an extra piece is only useful if you can actually use it.

27 Rc1–b1 f4–f3
28 Rb1–b3 Ba3–c1

The bishop does nothing here and would be much more usefully planed on d6.

29 g2xf3 g4xf3
30 Ne5–f7+ Kd8–e7
31 Bd3–g6 Nf6–d5

31... b7–b6, trying to get the pieces moving, must be better.

32 Nf7–e5+ Ke7–f6
33 Rg7–h7 a7–a5

Again, this does not help.

34 Rb3xf3+ Bc1–f4
35 h2–h4

At this point I walked up to the board, glanced at the position and congratulated White's programmer on having such a tremendous position. He looked flabbergasted and pointed out that he was a piece down. I then counted the pieces and had to agree that his arithmetic was correct but stuck to my assessment that the white program had the better chances. He looked at me disbelievingly as I walked back to my own game.

35 ... Ra8–a6

Another dud.

36 Kg1–f1 Ra6–c6
37 Bg6–e4!

37 Ne5xc6 would be a dreadful blunder — simply 37 ... Kf6xg6 leaves all White's pieces in trouble. Now Be4xd5 is a very serious threat.

37 ... Rc6–c1+
38 Kf1–e2 Rc1–g1
39 Be4xd5 Kf6–f5

39... e6xd5 loses horribly to 40 Rf3xf4+ Kf6–e6 41 Rf4xf8.

40 Rh7–h5+ Kf5–f6
41 Bd5–e4?

After all the good work (or, alternatively, after all Black's horrible moves), White reciprocates! Simply 41 Rf3xf4+, followed by Rf4xf8 and then retreating the bishop would have won easily.

41 ... Kf6–g7
42 Ne5–d3??

This is the real blunder, since 42 Rh5–h7+ Kg7–g8 43 Ne5–g6 would still win (for example, 43 ... Kg8xh7 44 Ng6xf8+ and 45 Rf3xf4).

42 ... Bf4–d6
43 Rf3xf8 Kg7xf8

Black is crawling out of the hole. True he is a pawn down and is objectively lost, but he has avoided being the extra piece down and he even has the two bishops.

44 Rf5–g5

Good. When ahead, exchange pieces. It is also a very good idea to reunite split pawns.

44 ... Rg1xg5

Had White taken the a-pawn last move, then Black would now have been able to play Rg1–g4.

45 h4xg5 b7–b6
46 g5–g6

This is premature, but, as it happens, does no great harm.

46 ... Bc8–a6
47 a2–a4 e6–e5?

It is remarkably generous of Black voluntarily to grant White two united passed pawns.

48 d4xe5 Bd6xe5
49 Ke2–e3 Be5–c7
50 f2–f3 Ba6–c8
51 Nd3–f4 Bc7xf4+?

Black should retain the two bishops.

52 Ke3xf4 Bc8–d7
53 Be4–c2 Kg8–g7
54 Kf4–g5 b6–b5
55 a4xb5 Bd7xb5
56 f3–f4 Bb5–c4
57 f4–f5 Kg7–g8
58 f5–f6

White's win is clear for all to see.

58 ... Kg8–f8
59 Kg5–f4 Kf8–e8
60 Kf4–e5 Ke8–f8
61 Ke5–d4 Bc4–a2
62 g6–g7+?

62 Kd4–c5 soon wins: for example, 62 ... Kf8–e8 63 Kc5–b5 Ke8–d7 64 Bc2–f5+ Kd7–d6 65 Kb5xa5 and the rest is trivial.

62 ... Kf8–f7
63 Bc2–h7 Kf7xf6
64 g7–g8B Ba2xg8

½–½

END

LAZING AROUND

Brainteasers courtesy of JJ Clessa.

What number, when subtracted from 100, gives the same results as when it is multiplied by 100?

Prize puzzle

In response to many requests, this month's puzzle is a problem in logic, although I've no doubt many of you will solve it by micro.

I have a pile of marbles — green, red, blue and yellow only — and different numbers of each.

I arrange all the red marbles into an exact rectangle containing several rows of marbles, with the same number of each.

I repeat the process for the three other colours using all the marbles in each case: the green marbles have the least number of rows; the red marbles contain one more row than the green; the blue marbles contain one more row than the red; the yellow marbles contain one more row than the blue.

For three of the colours, the number of marbles around the perimeter of the rectangle is exactly one half of the total marbles of that colour.

Which is the colour for which the latter is not true?

Answers on postcards or backs of envelopes only, please, to reach, *APC*, 2nd Floor, 215 Clarence Street, Sydney 2000, no later than January 30, 1987.

(JCC Clessa is on holiday, so the result of the October prize puzzle will appear in the February issue of APC.) END

IBM COMPATIBLE
PC/XT TURBO (8 MEG)

- * 640K Ram on mother board
- * Parallel & serial ports
- * Real time clock, batt. backup
- * 8087 socket
- * Key switch turbo
- * 8 slot socketed mother board
- * Delivery Australia wide **$20**
- * Twin 360K drives (Japanese)
- * Games port
- * Color graphics card
- * Front mounted reset switch
- * LEDS for turbo & hard drive on
- * 150 Watt power supply
- * 12 months full warranty

$1395 including tax

AT STYLE CASE & KEYBOARD

FULL RANGE OF PERIPHERALS INCLUDING

* 12" Hi Res. Comp. Mon. Green-Amber	**$175**
* 12" TTL Hi Res. Mon. 720*348	**$240**
* 14" RGB Hi Res. Mon. 720*240	**$695**
* Epson LX86 Printer with Tractor	**$499**
* 100 key keyboard extra	**$50**
* Z-Nix Mouse	**$125**
* DSDD Diskettes box 10	**$22**
* Printer Cables	**$25**
* CPBH80 Printer 80 col. 160 CPS	**$415**
* CPB-HI36 Printer 15" 160 CPS	**$695**
* 20 Meg. drive with DTC cont.	**$1090**
* Desks and Furniture	**$call**

COMPUTER & ELECTRONIC SERVICES PTY LTD
(03) 561 8947 BH
WHEELERS HILL VICTORIA 3150
(03) 561 4683 AH

BUY DIRECT FROM IMPORTER AND SAVE $$$ + 1 YEAR WARRANTY
DEAL WITH COMPUTER PROFESSIONALS AND GET BEST TECHNICAL SUPPORT

EXPRESS **8088 TURBO XT**
(4.77/8 MHz Switchable)

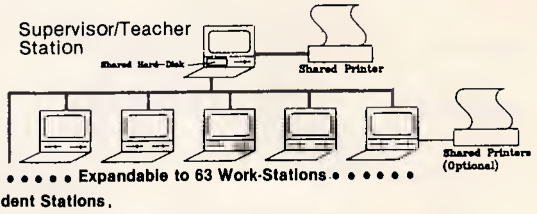
- 640KB RAM
- 2 x 360KB Floppy Disks
- Multi I/O Card with parallel, serial, game port
- Real time clock calendar
- Color Graphic Card
- 165W Power Supply
- Optional AT look-alike or enhanced keyboard
- Hard disk system from $1980 inc

$1580 inc

EXPRESS **80286 PC/AT**
(6/10MHz Switchable)

- 1 MB RAM on board
- 1.2 MB Floppy Disk
- 20 MB Hard Disk
- Parallel/Serial Card
- Monochrome/Color Graphic Card
- Clock Calendar
- Hardware Reset Switch
- Can run Xenix
- 200W Power Supply

$4300 inc


Supervisor/Teacher Station
Shared Hard-Disk
Shared Printer
Shared Printers (Optional)
Expandable to 63 Work-Stations
User/Student Stations.

TEN-NET, a true file serves, allows you to interconnect all your IBM PC/XT/AT or compatible with a half-size interface card and a set of network software. With the professional support from ECS, TEN-NET will be the best solution for OFFICE AUTOMATION or ELECTRONIC CLASSROOM.

Service
Fixed Price Service for IBM PC and Compatibles

Mother Board (XT)	$90
Hard Disk Controller	$75
Floppy Disk Controller	$45
Other add-on card	$70
APPLE II and Compatible	$70

All parts included

On-site maintenance contract also available
**** Printers/Monitors please call***

EFFICIENT COMPUTER SERVICES PTY. LTD.
4th Floor, Hong Kong Bank Building, 724-728 George Street.
Tel: (02) 281 1255, 281 1256. Fax: (02) 211 3058

USER GROUPS INDEX

Below is a complete list of User Groups known to us in Australia and New Zealand. User Groups' Secretaries are asked to provide us with alterations, additions and corrections as promptly as possible to avoid a longer than necessary delay before publication. During the next seven months these changes will be published and the next complete listing will appear in the June issue of APC.

NEW SOUTH WALES

NAME OF GROUP:	CATERING FOR:	MEETINGS:	CONTACT:
Albury/Wodonga MicroBee User Group	MicroBee	Meetings are held on the 1st Monday of the month (except January), at the Albury High School, 7.30pm.	Eric Eulenstein 202 Kooba Street Albury NSW 2640
Arcade & Adventure Club	Commodore 64/128	—	John Eden Jnr Lot 352 Bilinga Road Kincumber NSW 2250 (043) 69 3166
Ausborne User Group	All computers compatible with Osborne	Every 3rd Wednesday of each month at the Burwood RSL, 96 Shaftsbury Road, Burwood, NSW, beginning at 6.30pm.	The Secretary PO Box C530 Clarence Street Sydney NSW 2000 (02) 438 7084 Bulletin Board: AUSBOARD (02) 439 7072
Barrier MicroBee User Group	MicroBee	The group meets on the last Sunday of each month at the town library commencing at 3pm.	Michael Quinn Secretary 69 Eyre Street Broken Hill NSW 2880
Bathurst Computer Group	General	Meetings are held on the 2nd and 4th Friday of each month during school terms at 7.30pm at West Bathurst Public School.	Liz Haddon Secretary Bathurst Computer Group 10 Uralla Circuit Kelso NSW 2795
Bay User Group	Commodore 64/128	Meets on the last Thursday of each month, between 5 and 7pm at Nelson Bay High School.	Wayne Herring Secretary PO Box 308 Nelson Bay NSW 2315
Blakehurst Computer College	BBC	Meets on the last Thursday of each month at the Blakehurst Computer College, 642 Princes Highway, Blakehurst.	Lee Hourigan (02) 546 7399
Blue Mountains Homebrew Computer Club	General	Meets at members' homes.	Eric Lndsay 6 Hillcrest Avenue Faulconbridge NSW 2776 (047) 51 2258
Campbelltown User Group	General	—	Ernest P Leseberg 75 Lithgow Street Campbelltown NSW 2560
Cass-Gamer	TRS-80 Models 1, III, System-80 and Amstrad	—	Cass-Gamer PO Box 584 Port Macquarie NSW 2444
Cat User Group	Dick Smith Cat	—	Secretary Cat User Group PO Box 120 Neutral Bay NSW 2089
Central Coast Apple User Group	Apple and compatibles	The group meets on the first Tuesday of each month at the Central Coast Grammar School, Erina Heights from 7.30pm.	Charles Lee (043) 67 6845 or Mick Tierney (043) 41 9350
Challenger User Group affiliated with Sydney PC User Group	Dick Smith Challenger	Meets at the 4th floor, Standards House, 80 Arthur Street, North Sydney on the second Tuesday of each month beginning at 5.45pm.	Geoffrey Towns (02) 929 4618
Dapto BBC User Group (DBUG)	BBC	The club meets at 7pm on the last Wednesday of each month at 3/74 Princes Highway, Dapto NSW.	DBUG PO Box 447 Dapto NSW 2530
Eastern Suburbs Commodore	Commodore	Meets every 2nd Monday at 8pm, at the State Emergency Service Building, at the rear of 1355 Botany Street, Botany.	R Kellaway Secretary 10 Erang Avenue Kirrawee NSW 2232
80 Gamer User Group	TRS-80, System 80 and Color Computer users.	—	Jim Fisher 37 Fairburn Avenue West Pennant Hills NSW 2120
Gosford Commodore Computer Users (GOSCOM)	General	Meetings are held every 3rd Wednesday of the month at 7.30pm at the Narara Public School.	The Secretary GOSCOM PO Box 86 Umina NSW 2257
Great Western User Group	General	The club meets on the 1st Tuesday of each month, 8pm at the Greystanes Community Hall, Merrylands Road, Greystanes NSW 2145.	Secretary Great Western User Group PO Box 210 Wentworthville NSW 2145 (02) 631 2066 or (02) 636 9219

USER GROUPS INDEX

NAME OF GROUP:	CATERING FOR:	MEETINGS:	CONTACT:
Hawkesbury Microbee Users Group	MicroBee	General meetings are held on the 1st Friday of each month at 7.30pm. Workshop meetings are held on the 3rd Friday of each month at 7.30pm. Meetings are held at the Library, Richmond High School, Cnr Penrith Road and Lennox Street, Richmond.	Daryl Hadkins President 29 Brisbane Road Campbelltown NSW 2560 (046) 25 2900
Hewlett-packard User Group	H-P desktops and portables	—	H PUG C/- Darren Stokes 3 Buckley Drive Coonamble NSW 2829
Hitachi/6809 User Group	Hitachi/6809	Meets at 2pm, 1st Saturday of each month.	Rob Lohr President Hitachi/6809 User Group PO Box 966 Bondi Junction NSW 2022 (02) 662 4150
Hunter User Group	General	Meets at University of Newcastle, Room W308 Education Building on the 2nd Wednesday of each month at 8pm.	Secretary Hunter User Group PO Box 39 Broadmeadow NSW 2292
Illawarra Cat User Group (ICUG)	Dick Smith Cat	Meets on the 1st Monday of each month at the Little Flower Church Hall, 2 Powell Street, West Wollongong, commencing at 7pm.	Beth Cavallari Secretary PO Box 14 Kiama NSW 2533 (042) 32 2534
Illawarra IBM PC Club	IBM and compatibles	—	Secretary Illawarra IBM PC Club C/- John Lysaght (Aust) Ltd Delivery Code 29 PO Box 77 Port Kembla NSW 2505 (042) 75 6721
Katoomba Commodore Computer User Group	Commodore	Meets every 2nd Tuesday at Katoomba High School commencing at 7.30pm.	Secretary Katoomba Commodore Computer User Group 10 Roseberry Street Wentworth Falls NSW 2782
Macarthur Computer Users Association	General	Meets on the 1st Monday of each month at the Airds High School Library, Briar Road, Campbelltown, 7.30pm.	J Napier 23 Athel Tree Crescent Bradbury NSW 2560
Lismore C-64/128 User Group	Commodore 64	Meets on the 2nd Monday of each month at Kadina High School Library, commencing at 7pm.	Lismore Commodore 64/128 Computer Enthusiasts PO Box 385 Lismore NSW 2480 (066) 21 4054
OZBEEB	BBC	The group meets twice a month at the Australian Film and Television School — Open Program, 3 Lyon Park Road, North Ryde. A general meeting takes place on the 4th Monday of each month at 6.30pm.	OZBEEB PO Box 1030 Parramatta NSW 2150
Pocket Computer User Club	Pocket computers	Meets on the 1st Wednesday of each month (except January) at Woodstock Community Centre, Church Street, Burwood at 7.30pm.	Secretary PO Box 2220 Nth Parramatta NSW 2151
President Computer User Group	President and other IBM PC/AT-compatibles	Meets on the last Tuesday of each month (except December) at the Hornsby Inn (Claude Fays Hotel), 29 Florence Street, Hornsby at 8pm.	Raymond or Tricia Toms (02) 456 3756 Rick West (02) 872 4177
Sorcerer User Group	Sorcerer	Meets at the Greenwich Community Hall, Greenwich every 3rd Friday at 8pm.	Sorcerer User Group PO Box E162 St James NSW 2000 (02) 626 8020 (8pm-7am)
Spellbinder User Group (SBUG)	Apple	The group meets on the 4th Monday of each month, 6pm at Room 9, Ground Floor Trades Hall, corner of Dixon and Goulburn Streets, Haymarket.	Michael Burlace PO Box 171 Matraville NSW 2036 (02) 694 1033 (BH)
Sydney APL User Group	APL Users	Meets every 3rd Wednesday, 5.30pm at I.P. Sharp Offices, 8th floor, 55 Elizabeth Street, Sydney.	Laurie Gellatly GPO Box 1425 Sydney NSW 2001 (02) 232 6366
Sydney Commodore User Group (Sydcom)	Commodore	Meets every 2nd Wednesday of each month at the Cricketer's Club, 11 Barrack Street, Sydney.	Sydcom Box 1542 GPO Sydney NSW 2001
Sydney Kaypro User Group (SKUG)	Kaypro	Meets on the 2nd Tuesday of each month at the Burwood RSL Club, 96 Shaftsbury Road, Burwood, commencing at 8pm.	Hans Schneider 122 Murriverie Road Nth Bondi NSW 2026 (02) 309 2961
Sydney Macintosh Users Group	Apple Macintosh	Meetings are held on the last Tuesday of each month, 6.30pm at Laboratory 1, Carslaw building, Sydney University.	Sydney Macintosh Users Group Box 152 Holme Building Sydney University NSW 2006
Sydney MicroBee User Group	MicroBee	Meets on the 3rd Saturday of each month in the Assembly Hall at Strathfield Girls High School, Albert Road, Strathfield from 1 pm until 4pm.	Ron Taylor Secretary PO Box C233 Clarence Street Sydney NSW 2000 (043) 41 5251 (after 7pm)
TISHUG	Texas Instruments Professional, TI-994A	Woodstock Community Hall, Church Street, Burwood.	TISHUG GPO Box 302 Carlingford NSW 2118

USER GROUPS INDEX

VICTORIA

NAME OF GROUP:	CATERING FOR:	MEETINGS:	CONTACT:
Adam User Group	Coleco Vision Adam	Meetings are held as required at 10 Old Geelong Road, Point Lonsdale Vic 3225.	Dennis Riley President (052) 52 2237 or Frank Ellis Secretary (07) 345 7143
Amiga User Group	Commodore Amiga	Meetings are held on the 2nd Sunday of each month (except January) at Victoria College, Burwood Campus, Burwood Highway, Burwood; in Lecture Theatre 2, commencing at 2pm.	Secretary Amiga User Group PO Box 109 Nth Balwyn Vic 3104
Apple User's Society of Melbourne (AUSOM) Inc.	Apple	Meetings are held on the 1st Saturday of each month at the Burwood Education Centre, Victoria College, Burwood Highway, Burwood.	AUSOM Inc PO Box 49 Burwood Vic 3125
Australian ZX User Association Victoria	Sinclair computers: ZX80, ZX81, Spectrum, QL.	Meets every 3rd Wednesday of each month at the Mt Waverley Community Centre, Miller Crescent, Mt Waverley.	Cliff Restarick 208 Kooyong Road, Caulfield Vic 3161 (03) 528 2539
BBC User Group	BBC	Meets on the last Wednesday of each month, 7-9.30pm at Copiquest, 423 Clarendon Street, South Melbourne.	Secretary Mr G E Howell (03) 420 2611 (BH) or President Mr T Robinson (03) 386 7529 (AH)
Color Computer Club	TRS-80 Color Computer	Meets on the 1st Friday of each month at Geelong College at 8pm.	David Collen Secretary 12 Hereford Drive Belmont Vic 3216 (052) 43 2128
Essendon Commodore 64 User Group	Commodore 64	—	George Strathoulis 8 8yron Avenue East Keilor Vic 3036 (03) 337 4159
Forth Interest Group	Forth	Meets on the 1st Friday of each month at 8pm. Contact Secretary for details.	Lance Collins PO Box 103 Camberwell Vic 3124 (03) 29 2600
Geelong Atari User Group	Atari	Meets on the 1st Tuesday of each month at the Newtown Club, Skene Street, Newtown, commencing at 7.45pm.	Brian Oates Secretary PO Box 673 Geelong Vic 3220
Geelong Commodore Computer Club	Commodore	—	Peter Hamilton Secretary C/- 39 Vermont Avenue Corio Vic 3214 (052) 75 4949 or (052) 26 3596
KAOS	Ohio Scientific, Apple, Atari, IBM and others. Forth, CP/M, M/Code	The club meets at Essendon Primary School, Raleigh Street, on the last Sunday of each month at 1pm. And at the Hampton Scout Hall, corner of Kingston and Ludstone Street on the 1st Sunday of each month, at 2pm.	KAOS Secretary 17 Frudal Crescent Knoxfield Vic 3180 (03) 763 5983
MBUG Australia Inc.	MicroBee	Monthly meetings are held at 7.30pm on the 2nd Wednesday of each month at Mount Waverley Community Centre, Corner of Stephensons Road and Miller Streets, Mount Waverley.	Axel S Joscht Secretary MBUG Australia Inc. PO Box 157 Nunawading Vic 3131 RCP/M (03) 82 1571
Melbourne Atari Computer Enthusiasts (MACE)	Atari	Meetings are held at the Rotunda, Monash University on the 2nd Sunday of each month (excluding January), at 12pm.	MACE PO Box 340 Rosanna Vic 3084
Melbourne Color Computer Club	TRS-80 Color Computer	The club meets on the 1st and 3rd Tuesday of each month at the Uniting Church Hall, corner of Dandenong Road and Chapel Streets, St Kilda.	Mr Chris Hackett President 15 Redan Street East St Kilda Vic 3182 (03) 529 3735
Melb PC User Group Inc.	IBM and compatibles	Meets on the 2nd Wednesday of each month at 6pm at the Ground Floor Auditorium of Clunes Ross House at 191 Royal Parade, Parkville.	Secretary Melb PC User Group Inc. GPO Box 1728P Melbourne Vic 3001 (03) 481 1009
Lap Computer User Group	All lap computers	—	Sacretary Lap Computer User Group Box 2884DD GPO Melbourne Vic 3001
NM Micro User Group	Interested staff members of National Mutual in the Melbourne Head Office using any computer.	Monthly	Mr R Prewett Convenor NM MUG Box 2830 AA GPO Melbourne Vic 3001

USER GROUPS INDEX

NAME OF GROUP:	CATERING FOR:	MEETINGS:	CONTACT:
Otrona Attache User Group	Otrona Attache	—	David Broadbent Chairman C/- PO Box 21 Ashburton Vic 3147 (03) 528 2792
Peninsula Group	General	Meets at the Frankston Library on the 2nd Tuesday of each month at 7.30pm.	M G Thompson (03) 772 2674
Pocket Portable Programmers of Melbourne Inc.	Hand held computers or calculators	Meets on the 3rd Tuesday of each month on the 9th Floor of the Monash University Menzies building at 8pm.	Paul Cooper 40 Karen Street Box Hill North Vic 3129 (03) 898 7672 (AH)
Sorcerer & CP/M Users of Australia Inc. (SCUA)	Sorcerer, Excalibur, Bondwell and all machines which run the CP/M operating system.	Meetings are held on the 1st Sunday of each month (February to December), at 2pm. The location is Victoria College, Burwood Campus, 221 Burwood Highway, Burwood, Vic 3125.	Secretary SCUA GPO Box 2402 Melbourne Vic 3001
Southern Districts Commodore User Group	Commodore	Meets on the 1st and 3rd Wednesday of every month at the A.P.I. Hall, Kurrajong Road, Preston, at 6pm.	A Toms President 3 Lucille Crescent Casula NSW 2170 (02) 602 8691
Teach-80 Group	General	Meets on the 1st Wednesday each month at the Waverley Centre, Miller Street Mt Waverley.	G Behrendorff Secretary (03) 232 4569
Turbo Special Interest Group of Melbourne PC User Group	Turbo Pascal	Meets 3rd Monday of each month at St Marks Church, Cnr Burke and Canterbury Roads, Camberwell at 7.30pm.	Ron Savage PO Box 81 East Caulfield Vic 3145
Victorian Osborne User Group Incorporated	All Osborne types and any similar machines CP/M or MS-DOS.	Odd numbered machines — 4th Wednesday, 6pm at RMIT, Comms & Electronic Engineering Department, Building 12, floor 9. Even numbered months — 4th Sunday, 2pm at the Ashburton Public Library, 152 High Street, Ashburton.	Geoff Cartwright PO Box 169 Camberwell Vic 3124 (03) 459 8934 (AH)
Western Suburbs MicroBee User Group	MicroBee	1st and 3rd Thursday of each month at the Multiple Sclerosis Centre, corner of Furlong and St Albans Road, St Albans.	Ian Walker (03) 741 3625 or Bradley Bouchaud (03) 336 1019
Yarra Valley Commodore User Group	Commodore	Meets on the 1st Tuesday of each month at the Melba Hall, Cnr Market and Castella Streets, Lilydate at 8pm.	Yarra Valley Commodore User Group, PO Box 176 Lilydale Vic 3140

TASMANIA

NAME OF GROUP:	CATERING FOR:	MEETINGS:	CONTACT:
Microsoft User Group	16-bit IBM-compatible computers	—	Brett Russell PO Box 182 Ulverstone Tas 7315
Southern Tasmanian Amstrad Club	Amstrad	The group meets at 7.30pm on the 1st Wednesday of each month at Elizabeth Matriculation College (1st Floor).	Vern McKay 137 Roslyn Avenue Blackmans Bay Tas 7152 (002) 29 4528
SVI-MSX Australasian User Group	Spectravideo/MSX	—	SVI-MSX Australasian User Group PO Box 191 Launceston South Tasmania 724 (003) 44 2493
TI 99/4 User Group	TI 99/4 Users		Rex C Shephard 1 Benboyd Court Rokeby Tas 7019
Tandy Hobart User Group	Tandy	The group meets on the 3rd Thursday of each month at the Southern Regional Office of the Department of Sport and Recreation, Kirksway House, Kirksway Place, Hobart. Meetings commence at 8pm.	Tandy Hobart User Group GPO Box 1271N Hobart Tasmania 7001 (002) 72 1426 (AH)

A.C.T.

NAME OF GROUP:	CATERING FOR:	MEETINGS:	CONTACT:
ACT Apple	Apple	Meets on the 2nd Thursday of each month.	Secretary PO Box 1231 Canberra City ACT 2601
ACT VIC-20 User Association	VIC-20	—	Chris Groenhout 25 Kerferd Street WAtson ACT 2602 (062) 41 2316
Apricot Special Interest Group	Apricot microcomputers	—	Apricot SIG GPO Box 2229 Canberra ACT 2601 (062) 58 6677 (AH) Barry Zazoniuk
Australian Adventure Club	Apple and compatibles, Commodore 64	—	Charles Newton JR 19 Cloncurry Street Kaleen ACT 2617

USER GROUPS INDEX

NAME OF GROUP:	CATERING FOR:	MEETINGS:	CONTACT:
			(Commodore 64 users only). Bernard A Wiemers 10 Tardent Street Downer ACT 2602 (All other computer users).
Australian ZX User Association (ASUA)	Sinclair Computers	Meets on the last Wednesday of each month at the Woden Valley High School Library, Ainsworth Street, Phillip.	David Vernon AZUA 50 Waller Crescent Campbell ACT 2601
CAD Special Interest Group	Those interested in CAD applications	—	CAD SIG GPO Box 2229 Canberra ACT 2601 (062) 30 2508 (AH) Frank Taplin
C Language Special Interest Group	C Programmers	Meets on 1st Wednesday of each month, 8pm at the seminar room of the Jaeger Building, ANU.	C Language SIG GPO Box 2229 Canberra ACT 2601 (062) 58 3169 (AH) Credric Bear
Canberra Micro-80 User Group	TRS-80, System 80 and any other Z80-based microcomputers.	Meets on the 3rd Monday of each month in the large lecture theatre of Building J, Canberra Technical College, Constitution Avenue, Reid at 7.30pm.	Harry Cooper Secretary 113 Owen Dixon Drive Evatt ACT 2617 (062) 58 3700
Commodore User Group (ACT)	Commodore	Meets on the 1st Monday of each month at Melba High School and on the 3rd Monday at the Woden Town Centre Library.	Commodore User Group (ACT) PD Box 599 Belconnen ACT 2616
Com Special Interest Group	Computer communications	—	Com SIG GPO Box 2229 Canberra ACT 2601 (062) 58 9081 (AH) Alan Salmon
Compucolor User Group	Compucolor	—	Ken Kerrison 5 Beltana Road Pialligo ACT 2609 (063) 47 6575
Government Systems Special Interest Group	Those working with microcomputers in Parliament, the Judiciary, Government departments and authorities.	Meets on 1st Wednesday of each month at 4.30pm at Silverton Centre, Rudd Street.	Government Systems SIG GPO Box 2229 Canberra ACT 2601 (062) 48 4815 Bruce Rossell
Laptops Special Interest Group	Laptop microcomputers	—	Laptops SIG GPO Box 2229 Canberra ACT 2601 (062) 88 0027 (AH) Ray Roche
Open Access Special Interst Group	Open Access users	—	Open Access SIG GPO Box 2229 Canberra ACT 2601 (062) B1 2273 Warren Colledge
PC User Group	16-bit micros using PC/MS-DOS or CP/M-86	Meets on the last Monday of each month at 8pm at the Coombes Lecture Theatre, ANU. A mid-month meeting is also held (2nd or 3rd Wednesday, as advised) at the Colloquium Room, Jaeger Building, ANU at 8pm.	Secretary PC User Group GPO Box 2229 Canberra ACT 2601 (062) 80 5954
Sanyo Special Interest Group	Sanyo MBC 550/555	Meets on 1st Monday of each month, 7.30pm at the Blair Room, Canberra Workers' Club.	Sanyo SIG GPO Box 2229 Canberra ACT 2601 (062) 91 6194 (AH) Mike Cassidy
Survey and Statistics Special Interest Group	Those using microcomputers for statistical analyses and for preparation and execution of surveys.	Meets bi-monthly	Survey and Statistics SIG GPO Box 2229 Canberra ACT 2601 (062) 97 2697 (AH) Bill Fitzgerald

QUEENSLAND

Ad Lib VeeZed Micro Club	VZ-200/300	—	Ad Lib VeeZed Micro Club 13 Brookes Street Biggenden Qld 4621
Adventure Club	Commodore 64/128	Postal only. Bi-monthly newsletter.	Adventure News Stuart Elflett M.S.F. 550 Toogoolawah Qld 4313 or Adventure News Jamie Osborne 123 Beatrice Street Doubleview WA 6018
Australian Postal Institute Computer User Group	—	Meetings are held on the 1st Monday of each month, 6.15pm at 14th floor, AAMI building, 97 Creek Street, Brisbane.	Steve Devine (07) 835 7044 or Keith Atkinson (07) 835 8033

USER GROUPS INDEX

NAME OF GROUP:	CATERING FOR:	MEETINGS:	CONTACT:
Brisbane Apple User Group	Apple	—	Brisbane Apple User Group PO Box 721 Sth Brisbane Qld 4101
Brisbane Spectravideo & MSX User Group	All MSX and Spectravideo	Meets every 3rd Tuesday of each month at 25 Primrose Street, Woodridge at 7.30pm.	Lucille Parker Secretary 25 Primrose Street Woodridge Qld 4114 (07) 208 5951
Brisbane 16-bit User Group (BRISBUG)	16-bit micros	Meets on the 3rd Sunday of each month, 2pm at the Toowong High School.	Roy Willie Jnr BRISBUG PO Box 305 Wynnum Central Qld 4178
Bundaberg Commodore Computer User Group	Commodore	The group meets on the 1st Sunday of each month from 10am to 4pm at the West State School Library, Steffensen Street, Bundaberg.	(071) 72 7098 or (071) 79 2426
Cairns Commodore User Group	Commodore	—	PG Aiken Secretary Cairns Commodore User Group PO Box 7 Earlville Cairns QLD 4870
Commodore Computer User Group (Qld) Inc.	Commodore	Meetings are held on the 1st Tuesday of each month (except January), at 7.30pm in the Playground and Recreation Association Hall at the corner of Love Street and Water Street in Spring Hill, Brisbane.	Norm Chambers PO Box 274 Springwood Qld 4127 (07) 341 5651
Commodore Computer Users Group (Townsville)	Commodore	Meetings are held at 7.30pm on the 1st Wednesday of every month (except January), at the computer room of Ignatius Park College, Ross River Road.	Bruce McGovern Secretary 43 Fitzroy Street Cranbrook Townsville Qld 4814 (077) 75 4349
Compucolor User Group	Compucolor	Meets on the 2nd Saturday of each month at 1pm	Ray Halliday 325 Enoggera Road Newmarket Qld 4051 (07) 356 4236
Darling Downs Apple Users Group	Apple	Meets on the 3rd Tuesday of each month at the Toowoomba Education Centre, Baker Street, Toowoomba.	Darling Downs Apple User Group PO Box 53 Darling Heights Qld 4350 or contact the group Secretary Alan Chapman (076) 36 4853 (AH) (076) 32 3933 Extension 1 (BH)
Memotech Computer User Group	Memotech	—	Memotech Computer User Group PO Box 497 Maroochydore Qld 4558
NEC PC-8000 User Group	NEC-PC-8000	Meets on the 2nd Friday of each month at the Old Town Hall, South Brisbane.	NEC PC-8000 User Group C/- David M Clark 18 Provence Street MacGregor Qld 4109
Queensland Atari Computer Enthusiasts (QACE)	Atari	Meets on the 3rd Wednesday of each month at the Yeronga State School· Park Road, Yeronga at 7.30pm.	QACE PO Box 17 Acacia Ridge Qld 4169
Queensland Amstrad Users Cassette Journal	Amstrad	Circulation of a monthly cassette or disk.	Frank Ellett 59 Twentyseventh Avenue Palm Beach Qld 4221 (075) 35 5815
Queensland CP/M Users	Any CP/M computer	Meetings are held on the last Sunday of each month at the University of Queensland Civil Engineering Work Room 1.01 (off Staff House Road) from 1pm.	Secretary/Treasurer PO Box 1025 Milton Qld 4064 (07) 369 4288
Sega User Group	John Sands Sega	—	Keith Zuch (07) 288 3115 or Robert Horkings (07) 52 5603
Sharp User Group of Brisbane	Sharp	The club meets on the 2nd Wednesday of each month at the Graceville State School.	Bill Laidlaw 51 Sandon Street Graceville Qld 4075 (07) 379 3457
Southport Commodore Computer User Group	Commodore	Meets fortnightly at the Labrador State Primary School, Turpin Road, Labrador.	Mark Voevodin Secratary (075) 50 2299 or John Smith Co-Secretary (075) 58 2929
Townsville MicroBee User Group	MicroBee	Meets at 7.30pm on the 2nd and 4th Monday of each month at St Margaret Mary's School, Hermit Park, Townsville.	Mannie Van Rijswijk (077) 73 4236

USER GROUPS INDEX

NAME OF GROUP:	CATERING FOR:	MEETINGS:	CONTACT:
TRS-80/System 80 Computer Group	TRS-80 (Models I, III, 4, 4P), and System 80	Meets on the 1st Sunday of each month (except January), at 2pm, at Lindum Hall, Lindum Road, Lindum (near Wynnum, Brisbane)	W J Allen Secretary 16 Laver Street Macgregor Qld 4109 (07) 343 5771
University of Queensland Kaypro User Group	Kaypro	Meets bi-monthly at the Botany Department.	David Yates 377 2070 (Botany Department)
University of Queensland Osborne User Group	Osborne	Meets on the 2nd Tuesday (odd months), and 2nd Wednesday (even months), at the Axon Building (on campus), at 7pm.	Glen McBride C/- Womens College College Road St Lucia Qld 4067 (07) 870 1177
VZ South Pacific User Group	VZ-200/300	—	John D'Alton 39 Agnes Street Toowong Qld 4066 (07) 371 3707

SOUTH AUSTRALIA

NAME OF GROUP:	CATERING FOR:	MEETINGS:	CONTACT:
Adelaide Atari Computer Club	Atari	The group meets at the Gillies Street Primary School, City, on the 1st Monday (2nd, if 1st is on a public holiday), and 3rd Monday of each month at 7.30pm.	Adelaide Atari Computer Club PO Box 333 Norwood SA 5067
Adelaide Sega User Group	John Sands Sega	—	Jan Jacobsen (08) 382 7967 or Jamie Anderson (08) 263 5020
Australasian Aquarius Users Club	Aquarius Computers	Bi-monthly newsletter	Australasian Aquarius Users Club 7 Duncraig Lane Stirling SA 5152
Beebnet	BBC and Econet	Meetings are held on the last Monday of each month.	Beebnet PO Box 262 Kingswood SA 5062
Darwin PC User Group	IBM and compatibles	The group meets on the 1st Sunday of each month at 5 Binet Court, Malak, at 8pm.	Terry O'Brien 5 Binet Court Malak SA 5793 (089) 27 4454
Hitachi User Group	Hitachi	—	Cliff Hignett 45a Ormond Avenue Daw Park SA 5041 (08) 276 7706
MicroBee User Group of South Australia Inc.	MicroBee	Meets on the 3rd Monday of each month (except January), at 18 Arthur Street, Unley, 7.30pm.	Secretary GPO Box 767 Adelaide SA 5001
South Australian Apple User Club Inc.	Apple II series and has a Mac user group.	The club meets on the 1st Friday of each month at the Prospect Town Hall.	SA Apple User Club PO Box 322 Prospect SA 5082 Secretary (08) 293 7183
South Australian Commodore User Group	Commodore	Meets on the 1st Tuesday of each month at Gilles Street Primary School, Gilles Street, Adelaide, at 7.30pm.	SA Commodore Users Group PO Box 427 North Adelaide SA 5006

WESTERN AUSTRALIA

NAME OF GROUP:	CATERING FOR:	MEETINGS:	CONTACT:
Amswest	Amstrad	Meets on the 3rd Tuesday of each month at 7.30pm, Sherton Park.	Amswest PO Box 1099 East Victoria Park WA 6101
Australian QL User Association (AQUA)	Sinclair QL	Meets every other month.	Graeme Ashford Secretary 12 St Michael Terrace Mount Pleasant WA 6153
Australian Turbo User Group	All Pascal and Modula-2	The group meets monthly (Feb to Nov), every 2nd Tuesday at Room G-3, Electrical and Electronic Engineering Building, University of WA. (use Fairway entrance 3 or 4). The meeting commences at 7.30pm.	Australian Turbo User Group WA School of Computing and Computing Science 2/294 Rokeby Road Subiaco WA 6008 (09) 382 2692
BBC Teacher User Group	BBC	—	Drew Arbuckle Director of Computing Perth College PO Box 25 Mt Lawley WA 6050
Bondwell Australian User Group	Bondwell	—	Secretary Terry Doney PO Box 79 Gosnells WA 6110 (09) 398 6303
Compucolor User Group	Compucolor	As announced in newsletter.	Doug Grant 2 Brookside Avenue South Peth WA (09) 367 4465

USER GROUPS INDEX

NAME OF GROUP:	CATERING FOR:	MEETINGS:	CONTACT:
Excalibur 64 User Group	Excalibur	—	Jim Barbas (09) 342 3625 (AH) (09) 325 5809 (BH)
MicroBee User Group of Western Australia (MUGWA)	MicroBee	The meetings are held at 7pm on the 1st Sunday of each month at the Nurse's Lecture Theatre of the Sir Charles Gairdner Hospital, Shenton Park.	The Membership Officer GPO Box N1090 Perth WA 6001
Osborne User Group (OSWEST)	Osborne and other machines running CP/M.	Meetings are held on the 1st and 3rd Wednesay of each month at the Palmyra Recreation Centre (1st Wednesday), Subiaco Exhibition Hall (3rd Wednesday). Meetings are held at 7.30pm.	Robert Hunt Secretary OSWEST 4 Cato Street Glendalough WA 6016 (09) 444 0071
Sega User Group	John Sands Sega	—	John McLennan (09) 342 5905
Trycosopht	Commodore Amiga	—	Trycosopht 41 Ford Road Busselton WA 6280 (097) 524 023
WA Cromemco User Group	Cromemco and other S-100 and similar computers.	Meets monthly (Feb to Nov), every 3rd Tuesday at Suite 2, 294 Rokeby Road, Subiaco. Meetings commence at 7.30pm.	Secretary WA Cromemco User Group Suite 2/294 Rokeby Road Subiaco WA 6008 (09) 382 2692

NEW ZEALAND

EPSON Personal Users Group. CW Nighy. Telephone: 77 4268. Minerva NFC001. Meetings: 1st Tuesday of each month at 231 Khyber Pass Road, Auckland.

NZ Commodore User Group (AK): Kaye Coddigton. Telephone 58 8931, PO Box 5223, Auckland. Meetings: 3rd Wednesday of each month at the Remuera Primary School Hall, Dromorne Road, Remuera.

NZ Microcomputer Club Inc: Peter Taylor (Chairman). Telephone 57 6618, PO 8ox 6210, Auckland.

Tomorrow User Group: Chris Cotton. Telephone: 78 9153 or 39 6185. Meetings: 3rd Wednesday, ASMAIL, 205 Federal Street, Auckland City. ASMAIL system is also available to Australians. It can be contacted by Packet-Switch Networks such as AUSTPAC. Number is 0 5301 9700 0016. Enter at the prompt "asmail login:". The word 'asbox" to send a message to ASMAIL requesting membership information. The answer back code is AS0002MAIL. Address is: PO Box 39-159, or telephone 39 6185 Auckland. Users may join by telephone if they have a credit card.

STOP PRESS

A comprehensive list of available for Tandy Color Computer users wanting to locate their nearest User Group. This list may be obtained by writing to Andrew White, 24 Barfoot Street, Bracken Ridge, Qld 4017. The list is much too long to be published in APC.

DON'T MISS AN ISSUE!

Computers and Add-On Cards for PC/XT/AT Compatibles

SI-8000 for IBM PC/AT Compatibles
SI-3005T PC/XT Turbo Compatibles

- AT/XT Main Board (6-8-10-12.5 MHZ)
- AT, XT 1.2 MB Floppy controller
- AT H.D.D./F.D.D. Adaptor
- AT 2.5MB, 3MB RAM Card
- AT 2.5MB, 3MB, 3.5MB Multifunction Card
- XT Multi I/O Adaptor
- AT, XT 384, 512, 640KB RAM Card
- AT, XT Eprom Writer (2716 to 27512A)
- AT, XT Serial/Parallel Adaptor

NEW !
- AT, XT E.G.A. Card (720×348)
- Multi I/O Video FDD Card
- Short Type HDD Controller
- Multi Display Card
- Mono/Color Graphics Display Card

NEW DESIGN FOR PC/AT/XT COMPATIBLES

AGENT WANTED!

NEW !

Manufacturer & Exporter
SAILING STRONG INTERNATIONAL CO., LTD.
Office: 5-5F, 191, Fu-Shing N. Rd., Taipei, Taiwan, R.O.C.
P.O.Box 18—105 Taipei, Taiwan, R.O.C. Fax: 886-2-7213094
Tel: (02) 716-7737, 716-2841 Telex: 10318 SITNL
Factory: No. 47-1, Pao Shin Rd., Shintien, Taipei, Taiwan, R.O.C.

IBM PC/XT/AT are registered trademark of IBM Corp.

FAX: 886-2-9175962
CABLE: HORATIAN TAIPEI

HORATIAN ENTERPRISE LTD.

TEL: (02) 917-5954
P.O. BOX: 7-458 TAIPEI, TAIWAN, ROC
TELEX: 22710 HORATIAN

INDEX

CONNECTOR & CABLE

- **D-SUB CONNECTOR:**
  SOLDER TYPE, DIP STRAIGHT TYPE
  CRIMPING TYPE, RIGHT ANGLE TYPE,
  FLAT-CABLE TYPE
  9, 15, 19, 37, 50 male & female.
- **CENTRONIC CONNECTOR:**
  STANDARD SLODER TYPE, RIGHT
  ANGLE TYPE, STRAIGHT P.C.B. INSERT TYPE
  FLAT-CABLE TYPE
  14, 24, 36, 50 male & female.
- CARD EDGE CONNECTOR 20, 24, 26, 34, 40, 50 ways for flat cable.
- DUAL ROW SOCKET 10,14 — 60, 64 Ways for flat cable.
- SINGLE and DUALROW PIN HEADER.

- GPIB. IEEE-488 INTERFACE CABLE.
- RS-232 CABLE.
- CENTRONIC CABLE.
- MODEM CABLE.
- IBM PRINTER CABLE.
- IBM PC/XT, AT DRIVE CONTROL CABLE.

Procomm Update

Steve Withers has news of the bugs in the latest version of Procomm, plus a full bulletin board listing.

As luck would have it, we downloaded a copy of a new version of Procomm shortly after the deadline for the December issue. Procomm 2.4.1 is not radically different from 2.3, but some of the changes relate to aspects of the package that we highlighted last month.

The auto-dial suffix can now be changed by the user, so the program will now work with non-Hayes modems, such as those conforming to CCITT V25bis.

The publisher has changed its name from PIL Software Systems to Datastorm Technologies, Inc. The address remains the same, as does the price of Procomm.

Our warning about the time needed to download Procomm needs re-emphasising. On the system we accessed, the package was contained in two ARC files, one for Procomm and its support files (136k), the other for the manual (134k). It took about three-quarters of an hour at 1200bps, so if you are offered a copy on diskette by a friend, it's worth accepting.

Just to show how hard it is to keep up with program updates, we have seen a USENET news item reporting a bug fix for Procomm 2.4.2! When running under DOS 3.2 the control-break key will hang the system. The problem can be avoided if you make a copy of Procomm and carry out the following commands:

```
RENAME PROCOMM>EXE
  PROCOMM.BIN
DEBUG PROCOMM.BIN
E 8686 0
W
Q
RENAME PROCOMM.BIN
  PROCOMM.COM
```

User Works Network

The final paragraph of last month's column was truncated somewhere in the editorial process. It was supposed to read:

"To become a member, send the appropriate fee and a stamped self-addressed envelope to

User Works Network
122 Porteus Drive
Seven Hills, 4170.

You must also provide your full name, home address, home and work phone numbers, computer type, and modem type and speeds. This information will be considered confidential. Inclusion of your date of birth and occupation is also requested, but is not mandatory".

The truncation also meant that Larry Lewis, Mark Looi, James Williams, Tim LeLievere, Bill Bolton, Matthew Corica, and "Dr Vector" didn't receive the customary acknowledgement for their contributions to the listings.

While we are on the subject of bludners, the November column was attacked by gremlins too. The character sequence that we thought suggested mild confusion was intended to be

#-}

A furrowed brow and a crinkled smile?

The material in this column is presented in good faith, but as it is collated from material provided by readers, *APC* cannot take responsibility for its accuracy. New information and corrections are always welcome (but please mention whether or not you can vouch for the accuracy of the material you provide), and should be sent to:

Steve Withers, C/- Computer Publications, 47 Glenhuntly Road, Elwood, Vic 3184 or to Viatel mailbox 063000030.

Acknowledgements will normally be made through this column. You may also like to send a copy of the information to the Australian PAMS Coordinator at one of these addresses:

PO Box E41, Emerton, NSW 2770,
ACSnet prophet@runx
Prophet Bulletin Board (02) 628 7030.

System news

Since this is the month for our complete listing, there is no news! Well, that's not strictly true — if you examine the NSW and Victoria sections you'll find a few new systems.

NSW

Ace (02) 560 9846. Jeff Maddock. 6pm-9am weekdays, 24 hours weekends.

Adventure Line (02) 636 9027. 10pm-5pm weekdays, 10pm-8am weekends.

Arco-Tel (02) 683 3956. MV. Alex Szx. 24 hours daily.

AUGABBS (02) 451 6575. MV. Matthew Barnes and Andrew Riley. 24 hours daily. V21, V22, V22bis, V23.

Augur (02) 661 4739. MV. Mark James. 24 hours daily.

Ausborne (02) 439 7072. MV. Ausborne Ltd. 24 hours daily.

Aust Talc (02) 438 3479. 24 hours daily. V21, V22. A FidoNet system.

Bee-Hive (02) 520 7237. P. Paul Pinches. 9am-6pm Friday-Monday.

BERT (02) 211 0855. P. Resource Data. 24 hours daily. V23 videotex.

Blackboard (02) 526 1343. MV. Will Black.

Books (02) 525 5781. MV. Chris Ruwalt. V21, V22, V22bis, V23. Ring-back system (ie dial the number, let it ring once, hang up, dial again and wait for the computer to answer).

Bounty (02) 918 3256. MV. David Lloyd. 24 hours daily.

The Bulletin Board (02) 80 3681. MV. Brian Houlahan. A FidoNet system. Also on (02) 690 9400 for V22 8pm-7am daily.

Club 80 (02) 332 2494. MV. Michael Cooper. 24 hours daily. V21, V23.

Color Connection (02) 618 3591. MV. Barry Dornton. 24 hours daily.

Comet (02) 599 7342. MV. Eric Davis. 24 hours daily.

Commodore 64 (02) 664 2334. MV. Barry Dornton. 24 hours daily.

Computer Connection (02) 528 8968. M. Hamish Bowly. 5pm-9am weekdays, 24 hours weekends.

Contact (02) 550 1004. MV. Steven Williams. 24 hours daily. V21, V22, V23, Bell 103. Computer dating.

Csace (02) 529 8249. MV. Larry O'Keefe. 24 hours daily.

Dick Smith Electronics (02) 887 2276. P. Mark Grimmond. 24 hours daily.

Fantasy (02) 93 5225. MV. 9pm-7.30 am daily.

Fido Australia (02) 959 3712. 24 hours daily. V21, V22, V22bis. A FidoNet system.

Frontier Systems (02) 977 0323. MV. John Stanton. 24 hours daily. V21, V22, V23, Bell 103, Bell 212. A FidoNet system.

Galaxy (02) 875 3943. MV. Chris Nelligan. 24 hours daily.

Info Centre (02) 344 9511. MV. Paris Radio. 24 hours.

Information Connection (02) 521 1359. Roy King. 24 hours daily.

MacBBS (02) 623 2287. P. Ed Cox. Nearly 24 hours daily. V21, V23.

Metebeelus (02) 349 2366. MV. Tony Kemper, William Nitske. 6pm-9am weekdays (except Thursday, 10pm-9am), 3pm Saturday-9am Monday.

Micro Design Lab (02) 663 0150, (02) 663 0151. P. Kevin Lowton. 24 hours daily.

Nebula (02) 407 2729. MV. Sean Craig.

NSW Ace (02) 529 2059. MV. Larry O'Keefe. 24 hours daily.

Omega Line (02) 457 8281. P. Geoff Arthur. 24 hours daily. V21, V22, V23. A FidoNet system.

Omen I (02) 498 2495. MV. Ted Romer. 4.30pm-9am weekdays, 24 hours weekends. V21, V23.

OS9 Connection (02) 451 2954. MV. Graeme Nichols. 7.30 pm-10pm Tuesday and Thursday, 10pm Saturday, 6am Sunday.

Palantir (02) 451 6576. P. Steve Sharp. 24 hours daily. V21, V22, V23.

Phantom Land (02) 399 7716. MV. Bob James. 24 hours daily

Prophet (02) 628 7030. MV. Larry Lewis. 24 hours daily.

Pursuit (02) 522 9507. MV. Warren Hillsdon. 24 hours daily.

RCOM (02) 667 1930. MV. Simon Finch. 24 hours daily. Must use Commodore 64 with RTerm software.

Realtors (02) 387 5335. Gary Stern. 24 hours daily. V21, V22, Bell 103, Bell 212.

Renegade (02) 631 2715. P Sam Sarkis. V21, V22, V22bis, V23. A FidoNet system.

RUNX unix System (02) 487 2533. MV. Mark Webster. 24 hours daily. Call (02) 48 3831 for system status. Also on (02) 48 3831 (V22) and (02) 487 1860 (V23).

Sci-Fi (02) 646 4865. P. Greg Hope. 10pm-5pm daily. V21, V23.

Scitec Olympic (02) 427 1212. 24 hours daily. V21, V22, V22bis. A FidoNet system.

Scorpio BBS (02) 621 7487 MV. Russ Morrison. 24 hours daily. C64, full access $25 — contact 64 Blacktown Users Group.

Sentry (02) 428 4687. MV. Trev Roydhouse. 9pm-6am weekdays. 8pm-6am weekends. A FidoNet system.

SMUG-Bee (02) 607 7584. MV. Bob Fryer. 24 hours daily.

Software Tools Remote (02) 449 2618. Bill Bolton. 24 hours daily V22 and V22bis only. A FidoNet system.

Sorceror Users Group (02) 626 8020. MV. John Cepak. 24 hours daily.

The Spring Board (02) 533 1482. MV. Dr Vector. 24 hours daily.

Sydney PC Users Group (02) 238 9034. MV. Geoff May. 24 hours daily. Also on (02) 221 5520 for V22. Bytenet listings.

Syntax's Error (02) 645 3406. MV. 24 hours daily.

Tachyonics (02) 438 2682. MV. Richard Lenz. 24 hours. V21, V22. A FidoNet system.

Tandy (02) 625 8071. MV. 24 hours daily.

Tesseract (02) 651 1404. MV. John Hastwell-Batten. 24 hours daily. V21, V22, V22bis, V23.

Texpac RBBS, M. Shane Andersen. Mon & Tues 7pm-6.30am, Wed 7pm-Mon 6.30am. For membership write to TISHUG. (attn Texpac Sysop), PO Box 595, Marrickville, NSW 2204.

Tube Line (02) 681 3376. P. Mark Buckingham. 24 hours daily.

Your Computer (02) 953 8074. MV. Matt Whelan. 24 hours daily.

Zeta (02) 627 4177. MV. Nick Andrew. 24 hours weekdays, 7pm-7am weekends.

Abcom (047) 36 4165. MV. Ben Sharif. 24 hours daily. V21, V22.

Appletech (042) 71 5514. MV. Peter Tomlin. 8pm-11pm weekdays, 6pm-midnight weekdays.

Griffith Computer Association BBS P. (069) 62 7272. Greg Bodger. Ring-back System. Program downloading.

Illawara (042) 84 4354. MV. John Simon. 24 hours daily.

Infocom (042) 51 5094. 24 hours daily.

Jupiter (063) 31 5041. P. John Dyson. 9pm-10.30pm daily. Phone will be answered by a person.

Newcastle Microcomputer Club RCPM RBBS (049) 68 5385. MV. Tony Nicholson. 5pm-8.30am weekdays, 24 hours weekends, RBBS free to all, RCPM for members only — $4/year to PO Box 293, Hamilton, NSW 2303.

ACT

Commodore User Group (062) 54 7365. MV. James Hacker. 24 hours daily.

Comtel (062) 261383. MV. Warren Mason. 24 hours daily.

Data-Link (062) 99 1543. MV. Fred Flinstone. 24 hours daily.

FatCat (062) 41 4395. MV. Ross Boys. 24 hours daily.

PC Exchange (062) 58 1406. MV. Phil Harding. 24 hours daily. V21, V22, V22bis, V23.

Professional Computer User Group (062) 58 9967. MV. Alan Salmon. V21, V22, V22bis, V23. A FidoNet system.

SeaDog Fido (062) 58 9967. MV. Alan Salmon. 24 hours daily.

Victoria

68000 Information Exchange (03) 579 0934. P. Robert Nagy. 24 hours daily. Amiga, Atari, Macintosh.

ABE (03) 288 3599. P. Richard Gardiner. 24 hours daily. V21, V22.

AM-NET (03) 366 7055. Peter Haligarten, 24 hours daily. V21, V23, and packet radio.

Atlantis International (03) 277 6824. P John Edwards. 24 hours daily. V21, V22.

AUSOM BBS (03) 877 1990. MV. Grahame Willis. 24 hours daily.

AUSOM MacSIG (03) 435 9152. P. 24 hours daily. V21, V22.

BERT (03) 602 1552. P. 24 hours daily. Business and economic news. Also on (03) 67 7371 for V23/Videotex users.

BUGM RCPM (03) 500 0562. P. Sol Green. Midnight-6pm Monday-Saturday, Midnight-Midday Sunday.

C64-BBS (03) 489 4557. MV. Alan Miles. 24 hours daily. Commodore 64 software up/downloading.

Castle Mania (03) 379 5123. P. Anonymous. 7pm-midnight daily.

Commodore Board (03) 875 1023. P. Keith Jarvis. 10pm-8am daily.

Cycom (03) 727 1018. Darren Huyson. 6 pm-6am daily. V21, V22, V23.

DECUS Melbourne (03) 63 9133. Jay Ondracek, 24 hours daily. V21, V22, V23, V22bis. DECUS members only (but membership is free), caters for Rainbows to VAXes, public domain software downloading (CP/M and MS-DOS). A FidoNet system.

Down Under Software — Amiga (03) 429 8079. P. Greg Hudson. 6.30am-4.15am daily. V21, V22, V22bis, V23, Bell 103. A FidoNet system.

Down Under Software — IBM (03) 429 5819. P. Greg Hudson. 6.30am-4.15am daily. V22, V22bis, Bell 103, Bell 212. A FidoNet system.

Duncan (03) 602 5200. P. 24 hours daily. Computer news and advertising.

Eastwood RCPM (03) 870 4623 M. Mick Stock. 4pm-midnight. Monday-Friday ONLY. V21 originate or answer.

Harbourd (03) 587 2504. MV. David Harbour. 24 hours.

Hi-Tech (03) 397 1165. MV. Clement Maloney. 24 hours daily.

The Magic Pudding (03) 428 2178. Rupert Russell. 7pm-7am daily.

MICOM CBMS (03) 762 5088. MV. Peter Jackson. 24 hours daily.

MicroBee (03) 82 1571. Mike Thompson. 24 hours daily.

Microlink (03) 233 0230. P. Mike Thompson. 24 hours daily. V21, V23.

Midnight Frog (03) 596 1589. Scott Enwright. 24 hours daily. V21, V22, V22bis, V23. A FidoNet system.

Motel International (03) 509 9611. P. Kim Gration. 24 hours daily. V21, V22, V22bis, V23.

National (03) 819 5582. John Blackett-Smith. 24 hours daily. V21, V22, V22bis. A FidoNet system.

Omen IV (03) 846 4034. P. Philip West. 24 hours daily.

The Outer Limits (03) 725 6650. P. Captain Kirk. 5pm-6am weekdays, 24 hours weekends. Science fiction: stories, quiz and reviews.

Pacific Island. (03) 890 2174. P. Craig Bowen. 24 hours daily.

PC-Connection (03) 528 3750. MV. Lloyd Borrett. 24 hours daily. V21 and V22.

PC Domain (03) 789 8918. Daryl Clayton. 24 hours daily. V21, V22, V23.

PC Oasis # 1. (03) 848 3331. P. Alan Williamson. 24 hours daily. Includes on-line sales.

PC Oasis # 2 (03) 898 3922. P. Craig Wilson. 24 hours daily. Includes on-line sales.

Profit (03) 529 8749. Andrew Hooper. 24 hours daily. V21, V22, V22bis, V23.

Public Resource #1 (03) 878 2918. P. D Harvey. 24 hours daily. V22 and Bell 103.

Public Resource #2 (03) 690 7220. P. D Harvey, W Clarke, R Nagy. 24 hours daily.

The Real Connection (03) 288 0331 P. Carla Miller, Andrew Moore. 24 hours daily. A FidoNet system.

Sam's (03) 563 1117. A FidoNet system.

SCUA (03) 754 5081. MV. David Woodberry. 24 hours daily. Public domain software downloading for members of Sorcerer and CP/M Users of Australia, Inc.

TERMICOMNET (03) 589 1692. P. 24 hours.

Thunder-Net Amiga (03) 791 1124. P. Blue Thunder, Fozzie Bear, The Wizard. 24 hours daily. V21, V22, V23.

Viatel Computers (03) 288 3599. P. Max Elliot. 24 hours daily. V21, V22, V23.

Videotex 4000 (03) 329 2936. V23 videotex only.

Abacus (057) 83 1964. Maurice Copeland. 8am-noon, 4pm-midnight daily V23.

Mail-Bus (051) 27 7245. MV. Max Moore. 24 hours daily. Now allows non-members to read and reply to bulletin board messages.

MIN-NET (054) 41 3031. MV. Mal Fields. 24 hours daily. Enquiries to (054) 43 2589 during business hours ONLY.

Queensland

ACEA (07) 341 0285, 24 hours daily. Commodore.

AM-PAK (07) 263 7070. MV. John Bews and Brian Wendt. 24 hours daily. V21, V22, V22bis, V23 and packet radio.

BEX II (07) 395 1809. MV. Rick Dalley. 24 hours daily. User Works Node 4.

Brisbane MicroBee (07) 38 4833. P. Graham Scott. 24 hours daily.

CCUG (07) 808 2125. 24 hours daily. Commodore.

Commodore Express (07) 393 5352. Craig Upton.

Communications Interchange (07) 200 7664. Geoff Leff.

Competron (07) 52 9498. David Johnson. 24 hours daily.

Computer Orchard. (07) 350 1300. Scott Pierce.

ED-RCP/M (07) 266 3369. M. Andrew Waddell. 24 hours daily. User Works Node 1.

Electric Dreams (07) 399 1322. MV. Joe Altoff. User Works Node 5.

Futex (07) 283 2034. Paul Salanitri.

Hi-Tech (07) 38 6872. Clyde Smith-Stubbs. 24 hours daily.

The Hacker's Hotline (07) 800 5573. Dr Who. 5pm-6am weekdays, 24 hours weekends. V21, V22, V23.

Hotline (07) 353 3718. MV. Lionel Theunissen. 24 hours daily. User Works Node 3.

Info Interchange (07) 200 7664.

Kangaroo Point TAFE (07) 393 1763. Troy O'Malley. 24 hours daily.

Minight Express (07) 856 4363. MV. Lloyd Ernst. 24 hours daily. V21, V23. User Works Node 6.

MSL (07) 341 0285.

Rapple-Q (07) 284 6145. Terry Sweetser, G Black, V Crosdale. V21, V22, V22bis, V23.

Tomorrowland (07) 394 2300. 24 hours daily.

CAD-IBBS (070) 51 1360. Neil Barker. 24 hours daily. V21, V22, V23. Software for IBM, MicroBee, Amstrad, Commodore etc.

CoCoLink (075) 32 6370. 24 hours daily. For Tandy Colour Computer users.

Telegold (075) 31 6155.

Toowoomba Computer Centre (076) 32 7542. 6pm-8am weekdays, 24 hours weekends.

SA

Adelaide Micro Users Group (08) 271 2043. MV. Richard Newcombe. 24 hours.

The Electronic Oracle (08) 260 6222. MV. Don Crago, Grayham Smith. 24 hours daily. V21, V22, V22bis, V23.

Multiple (08) 255 5116. MV. Danny Vosso. 9pm-9am daily.

Nexus (08) 243 2477. M. 24 hours daily.

Omen V (08) 382 4631. MV. Richard Siggs. 24 hours daily.

SAC 64 (08) 371 0435. MV. Peter Hinton. 24 hours daily.

NT

Omen II (089) 27 4454. Terry O'Brien. 24 hours daily.

Outback RCPM (089) 27 7111. Phil Sampson. 24 hours daily.

Telepack (089) 52 8852. Mark Little. 24 hours daily. V21, packet radio. Previously listed as Red Centre.

WA

Computext (09) 447 0522. Russell Stokes. 24 hours daily.

The Gathering (09) 272 4711. Ken Peters. 24 hours daily. V21, V22, V23.

Mouse Exchange (09) 330 5530. Leonard Hollings. 8pm-7am weekdays only.

NEMO (09) 370 1855. Graeme Platt. 24 hours daily. V21, V22, V23.

Omen III (09) 249 1555. Greg Watkins and Nigel Read. 24 hours daily. V21, V23.

The Pad (09) 337 2941. Mark Lillywhite. 24 hours daily. V21, V23.

Perth PC Users (09) 227 9229. 24 hours daily.

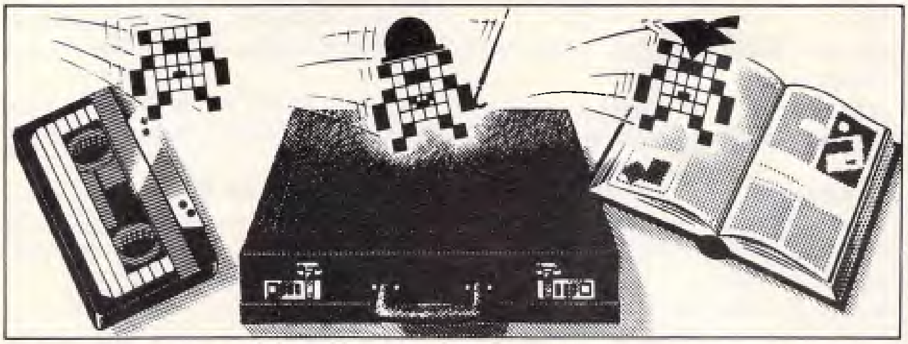
The Programmers Exchange (09) 274 6851. Matthew Corica. 7pm-7am weekdays, 24 hours weekends.

Z-Node 62 (09) 450 0200. Lindsay Allen. 24 hours daily.

Kalgoorlie College RCPM (090) 21 7755. P. 24 hours daily.

Tasmania

Ian Campbell TBBS (003) 26 4248. 24 hours.



Games

Scientific/mathematic

Business

Toolkit/utilities

Educational/Computer Aided Learning

Owen Linderholm selects the best readers' programs For details on submitting your own, see the box below.

Blunders

Before I get on to the programs, a few Bludners do occasionally creep into Program File. Here are a couple. In the July issue, the program Spectrum Globeplotter had an incorrect checksum within it. The checksum should have been 369280. Another reason people thought the program wasn't working is that the calculation to map a screen onto the surface of a sphere is very long, so the program spends about 10 minutes thinking before plotting out a sphere.

The other problem is more severe: we managed to mix up a bit of the 'hits and tips' part of Program File in the November issue. Two segments of code are mentioned in Commodore 64 IRQ Programs and Memory Saving. The first of these is in the text, but the second has been inadvertently added to the next piece on tips for WordStar. Once this confusion and the resultant mix-up in the text is known, it's fairly easy to follow the programs and explanation.

I received a letter while writing this from the author of the Commodore program, Justin O'Brien, pointing out another couple of mix-ups. In the listing given, the number 225 in line 30 should be 255. Also, a section of Basic program to put the machine code listing into memory was omitted. The program is:

```
10 FOR x=49152 TO 49182
20 READ a
30 POKE x,a
40 NEXT x
100 DATA 169,1,162,160,255
110 DATA 32,186,255,169,15,162
120 DATA 0,160,4,32,172,255
130 DATA 169,251,166,253,164,254
140 DATA 32,216,255,76,174,167
```

Something different

An anomaly within this month's Program File is that a program from the fractals feature on page 77 of this issue has been included. This will not be regular practice, but the program was originally destined for Program File, and by a happy coincidence fitted in very well with a fractals feature we had already commissioned. The program is for the Apple Macintosh, and displays the Julia and Mandelbrot sets using an intelligent and innovative technique to produce intermediary results very rapidly.

Although I don't want to make a habit of putting programs from features into Program File I *would* like to be able to put whole features in Program File itself. Very few of the programs I received have *any* commenting and documentation, let alone *adequate* amounts. Ideally, programs should be so well-documented that other users would be able to modify them for their own ends without having to spend five years tracing the logic involved. What I would like to see is Program File kick off with two, three or four useful, well-written and well-documented programs. The rest of the column could then be devoted to hints, tips and the kind of quick and dirty utilities that are useful for one machine only.

This month's program

The Program of the Month is very unusual. It's based on an article which describes how to set up a simple multitasking system for CP/M-80 computers. Competent programmers should be able to make use of it for similar systems such as other varieties of CP/M, or even MS-DOS or PC-DOS. The program is preceded by a long, explanatory article.

Next comes MacMand; this is the program that accompanies the article on fractals on page 77. The program is a perfect example of programming ingenuity overcoming a difficult programming problem. All standard Mandelbrot set or Julia set programs work by plotting the full resolution display a pixel at a time, or by plotting a section averaging an area, in order to produce a display that provides some information quickly. These displays are then updated as the program calculates detail more and more accurately. MacMand manages to do this without the inaccuracies and loss of time that previous techniques caused.

MacMand is easily converted to machines other than the Apple Macintosh. This is a great boon because it would be a pity if the 'tessellation' technique used could not be converted for other machines.

Other programs this month include BBC Interrupt-Driven Clock, Amstrad CPC Trace In Windows and Commodore 1541 Disk Utilities. The first of these is a simple real-time clock and alarm that keeps itself updated and displayed in a corner of the screen. The second is a program trace in a window so that it won't interfere with the display on an is a utility to provide simple disk manage- is: a utility to provide simple disk management functions on a wide range of Commodore computers and disk drives. There are also a few hints and tips, including a good piece on the prompt commands available on MS-DOS or PC-DOS machines.

Remember: all submissions should be accompanied by an sae.

APC is interested in programs written in any of the major programming languages for all home and small business micros. When submitting programs please include a cassette or disk version of your program, brief but comprehensive documentation, and a listing on plain white paper — typed if you have no printer.

Please ensure that the software itself, the documentation and the listing are all marked with your name, address, program title, machine (along with any minimum requirements) and — if possible — a daytime phone number.

Check through the previous Program Files to see the kind of programs we prefer. As a rough guide, original ideas are always welcome, as are good implementations of utilities and applications. Obviously the programs should be well-written, easy to understand, and preferably not too long (remember that other readers have to type them in).

All programs should be fully debugged and your own original, unpublished work. We prefer to receive programs with a maximum 80-column width printed in emphasised typeface.

We will try to return submissions if they are accompanied by a stamped, addressed envelope of the appropriate size, but please keep a copy of everything. Programs are paid for at the rate of $20 per page of published listing.

Send your contributions to APC Programs, Att. Stephen Crowley, P.O. Box 666, Fitzroy 3065.

Programs may also be sent to APC through Microtex 666's Direct Upload Facility (DUF). It's available on (03) 419 0856, accepts baud rates of 300, 1200 and 2400 (8 data bits, one stop bit, no parity), and runs each week night from 5.30pm. The system accepts ASCII and Xmodem file transfer standards. It's not restricted to 666 members.

legal

100% IBM PC/XT/AT Compatible

M-3355
PC/AT Computer
(assembled 8MHZ)

1. CPU: 80286 w/80287 socket
2. RAM: 640K on board
3. ROM: 16K BIOS
4. ONE 1.2 MB Floppy Disk Driver
5. Detached Intelligent Keyboard
6. FDD/HDD Disk Controller
7. Monochrome Graphic w/printer Card
8. Serial/Parallel Card
9. Eight Expansion Slot
10. Power: 200W

ALL KIND OF ADD-ON CARD FOR PC/XT/AT AVAILABLE ALSO.

M-3322
PC/XT **Turbo** Computer
(Two Speed)

1. CPU: 8088-2, 8/4.77 MHZ
2. RAM: 640K on board
3. ROM: 8K BIOS
4. Two Double Side Disk Drive
5. Detached Intelligent Keyboard
6. Disk Drive Interface
7. RGB Color card w/Composite
8. I/O: RS-232, Clock Calender, Parallel Printer port, Game Port
9. Eight Expansion Slot
10. Power: 150W, 110/220 VAC

AGENT WANTED.

MICROWAY ENTERPRISES CO., LTD.
P.O.Box 32-30 Taipei, Taiwan, R.O.C. Tel:(02)771-4809 Telex: 23125 MICROWAY Fax: 886-2-7814212

Program of the Month
CP/M-80 Simple Multi-tasking System

by Roland Eriksson

Although the vast majority of today's computer software is geared towards pure data manipulation in various kinds of business applications, there are still a few control system designers around who make their living producing software for machine control systems in the productive part of the industry. A couple of applications from Roland's own technical field are DC-motor speed regulators and furnace temperature controller systems for rolling mills, and various types of material-handling and transport systems.

The most characteristic thing about an industrial control system is that one single computer has many different and sometimes interrelated input and output channels to take care of, in order to make the production line operate properly. Writing software for such a system using the traditional single-task approach, ends up in a program consisting of one main routine which in turn calls a set of subroutines containing the actual control algorithms for each part of the machine. Using a modular approach for the software layout would probably result in a program that does the job, but also suffers from at least two problems which will make the computer perform less than optimally and be difficult to support in the long-run.

I will give the headlines of the problems first and then specific explanations.

- The need for routine transparency.
- Loss of system resolution from unnecessary execution of code.

Let's discuss the need for transparent routines first.

In the real world, it will be necessary to keep a more or less continuous guard on all the input channels in order for the program to decide when to activate/deactivate which outputs. As no computer has an unlimited amount of interrupt inputs for connection to external equipment, you are forced to use a polled I/O system that creates a need for a program which does not stop and wait for a specific external event to occur, but instead always continues with the next logical part in sequence, possibly skipping some part of the code by means of a GOTO statement (horrible thought). This rules out any use of REPEAT-UNTIL, DO-WHILE and FOR-TO-NEXT constructs, as all three cause the CPU to re-execute a small part of the code over and over again, and the necessary I/O polling in other parts of the program is thereby inhibited.

The only type of program flow control that's acceptable is the IF-THEN-ELSE construct which is always transparent, and having such a restraint imposed upon you must be regarded as a serious limitation.

Now for unnecessary execution of code. A main program that calls subroutines in successive order (Hen and Chicken programs) always puts the CPU at the same entry point in a routine each time the routine is called, regardless of whether the beginning part of the routine needs execution or not at this particular call. As most things that take place in an industrial piece of machinery can be seen as sequences of events, the ideal program design should reflect this, and re-executing code for events that have already been taken care of is just a waste of valuable CPU time. To illustrate the fact, here's a short example.

Imagine a hydraulic cylinder operated forward and backward by a computer via a magnetic valve. The cylinder has limit switches, connected to the computer, at each end of its travel. Whenever the computer receives a start signal from some other place (an operator, perhaps) the cylinder should be moved to the opposite position. A subroutine written to control this cylinder would logically begin with a check for the start signal, and as soon as it's received, start the cylinder in a direction towards the inactive limit switch. When that switch is activated, the magnetic valve is deactivated to make the cylinder stop. If this subroutine is always entered at the same point, you'll end up checking for the start signal and starting the cylinder over and over again, once for each program cycle, and all of these checks and starts are unnecessary except for the very first one that makes the physical start of the cylinder movement.

You are, therefore, spending valuable CPU time on parts of code that don't need execution, and this in turn degrades the system's capability to detect rapid external events in other parts of the program, thereby lowering the whole system's time resolution.

The solution to both of the problems discussed above is to base your application on a system with multitasking capabilities. In a multi-tasking system, the computer's CPU is treated as a sharable resource that is available to a number of separate programs which reside in main memory. The application is divided into smaller parts (tasks), and a separate program is written for each task in such a way that each task could be run alone with a minimum of interaction with other tasks. As each task is designed to run in its own environment, this also means that each task should have its own stack. Someone unfamiliar with the multi-tasking approach for design of a specific application might wonder what criteria to use to split the application into tasks. Judging from my own experience, I would say as a rule of thumb that each separate function in the external equipment would be a candidate for its own task.

If we take an industrial robot as an example, it would probably (but not necessarily) need one task for each of its drive motors, complemented with a small number of tasks for specialised math calculations.

The specific system that I will describe later has its roots in a design that I have used for a couple of years in my industrial work based on Intel Multibus hardware and Intel's ASM80 and PL/M-80 programming languages. For this article I have used the basic ideas behind my Multibus designs and created a similar system based on a CP/M-80 computer with BDS — C compiler version 1.50a and the CP/M assembler as programming tools. To make it possible to use another language when implementing this system, I have also included a pseudo code listing of all the kernel routines, so all you should need is a high-level language with a precisely defined assembler interface and the possibility to generate re-entrant code with its variables on stack.

The main purpose of the multitasking 'kernel' routines is to maintain a number of data structures where the state of all tasks are stored, and to switch the CPU from one task to the next. The actual form and declaration of these structures is given in the program example. As you can see, the data area consists of a number of stacks, one for each task in the system.

Each element of the stack is declared as a 'pointer to a void function', meaning a function that doesn't return anything of value. (That should be correct, as the primary function of each task is not supposed to return to anything at all.) When a task is active it uses the stack in a normal way for passing parameters, allocating local variable space and storing return addresses, but as soon as a task surrenders the CPU, the top of the stack will be filled with the current CPU register contents and the address where the task should be reactivated next time it gets hold of the CPU.

A kernel routine named 'nexttask()' is responsible for this status save action, and it also reactivates the next task in sequence from where it last left off. The question of stacksize to reserve for each task is answered by manual labour, meaning that you have to do your own calculations of the task's function nesting depth and corresponding allocation of variables. Don't forget to take into account any recursive routine that may gobble up stack space. In order to keep track of the stacks and active/inactive tasks, there's another data structure on top of it all with the name 'task_tab'. It has two integer elements, where the first one is static and contains the total number of defined tasks in the system. The second integer is updated dynamically by the 'nexttask()' routine and always contains the number of the currently active task.

Next there's an array of pointer elements declared as 'pointers to pointers to void functions' which are used to store the contents of CPU register SP (stackpointer) when a task surrenders the CPU. The net effect is that the array elements, all but one for the active task, point to the corresponding task's stacktop in memory. It's therefore possible for any task to have its register SP restored, and further, by the help of SP, restore the rest of the task's state before next reactivation. All this is done by the 'nexttask()' routine.

Tasks in the system are identified by a number ranging from 0 to (n-1) where 'n' is the total number of tasks defined in the system. Tasks are placed in a circular ring and the CPU is switched to the next task number in the ring when a task requests suspension by a call to 'nexttask()'. When the highest task number requests suspension, the 'nexttask()' routine will restart a new cycle by reactivating 'task 0'. When a task is resumed after suspension, the CPU will always start at the next instruction following its last call to 'nexttask()'.

This action described above takes care of both of the problems previously discussed, as it makes the following code sequence fully possible:

```
while limit_switch_x_is_inactive
{
      nexttask(&task_tab); /* let all
      other task's go */
}
```

(Here you place the code to execute when limit_switch_x goes active)

This code sequence will effectively stop the task in a wait for an active limit_switch_x, but will still allow all the other tasks to run. Periodically, the CPU will come back to this task (provided that all other tasks also execute a call to 'nexttask()') at the end of the 'while' loop, and that implies a new test of limit_switch_x leading to a break of the loop only if the switch is active. Suspension calls can be placed anywhere in a task and even in any of the functions called by a task. At least one such call must be present in every task in order to let all tasks use the CPU.

Another nice feature is that any specific functions in the system can be used by more than one task: at least that's true for the BDS-C compiler as it generates code that uses the current stack exclusively to pass parameters and allocate space for local variables. So, even if the function code only exists in one place in memory, the actual parameters it receives when called and its local variables will exist on different stacks depending on which task called the function. It's also possible to let the function make a call to 'nexttask()' to suspend the task that called it, and then have the same function promptly reactivated in a new environment as a result of an earlier call to 'nexttask()' in the same function, but called from another task.

By using the variable 'task_tab.act_no' in the main data structure (which should be treated as a read-only variable) the function can decide which environment it's currently active in, and from that make selections on what to do next. You should study and try to understand the program example in this article to get a better understanding of the possibilities that this will give you when writing compact code for your future applications.

From time to time you'll need a method for synchronisation between tasks. In 'big' real-time operating systems like Intel's RMX-80, RMX-86 or Digital Equipment's RSX-11M or VMS, that usually means using the operating system's built-in 'mailbox' or 'semaphore' system. Naturally this simple system will not give you any of these facilities, so you are forced to use globally-declared variables for signalling instead. The 'big guys' will tell you that this method is no good as it makes certain parts of the variable area accessible to tasks that are not supposed to know about them (avoid program bugs by hiding data), but I think it's OK in a small system like a CP/M computer, as the task communication variable area will not be that large anyway. If you manage to split your application into tasks in the most logical way, you will not need more than two to three signal variables per task and you should have no problem keeping track of them. Remember that most of the data used by a task will be allocated space on the corresponding stack, and in that way be protected from other tasks (I'm still talking in terms of the C languages).

Another problem area that must be discussed in connection with a multi-tasking system is the question of system deadlock. In a multi-tasking environment, all external equipment is regarded as resources that can be shared by different tasks; and to avoid access conflicts to these resources, you must implement a method to check if the resource is available or not. The easiest way to accomplish this is to define a global signal flag for each resource, and no task will be allowed to use the resource unless that flag is cleared. A task locks out other tasks from the resource by setting the flag as it gets hold of it. When several tasks use the same resources, the following situation may arise if you aren't careful when you write your code.

Imagine two tasks that each need two resources — a printer and an analogue-to-digital converter channel. One task requests the printer first and then the A/D converter; the other task needs the A/D converter first and then the printer. If the first task gets hold of the printer and sets the flag to lock out the other task, and at the same time the other task takes the A/D converter and sets the lockout flag for that one, then you're in trouble because when the second task is done with processing on the A/D converter and needs the printer, it must wait for it because it's held by the other task which in turn is waiting for the A/D converter as soon as it's done with the printer. Both tasks are in a deadlock position, waiting for the resource they need which is held by the other task. A system that's coded like this example may well be running well for a relatively long period of time, but according to Murphy's Law you're assured that the deadlock position for these two tasks will arrive at a time when you least want it to. You can use either or both of the following methods to avoid the problem:

- Never let a task have access to more than one resource at a time.
- Let all tasks that share resources request them in the same order.

To help you understand the nature of a sharable resource, here's a couple of examples of items that can be defined in terms of a resource:

- Almost all kinds of command-driven I/O interfaces like A/D and D/A converters, parallel and serial devices, and so on;
- Co-processors like a math processor or an I/O processor; and
- Globally-defined memory areas used for sending messages from several tasks to a specialised driver routine and that routine itself.

All items mentioned above are candidates for a stop/go access flag.

CP/M is, as standard, a single-user, single-task system, and all its BDOS and BIOS interface routines are designed to finish their work before they return to the caller. If you make a call to the function 'getchar()', as an example, in order to fetch a character from the console, that function will not return before someone hits a button on the keyboard. Used in our multi-tasking application that would be a disaster, as it stops all tasks until someone hits that key.

The solution is to always use the BDOS or BIOS status routines to decide if there's anything to fetch or to see if the printer can accept output before you make the actual transfer call. When it comes to the file I/O routines you are stuck with BDOS and its behaviour, and if you need them, you can only rely on your own capability to put the calls in time gaps where they hopefully don't do any harm to the system.

```
Pseudo code definitions and function manual

Array and structure definitions.

struct     env_save            /* environment structure template */


     int  max_no;

     int  act_no;

     void (**sptr_tab[MAXTASK])();

};

void      (*stack_n[STKLEN])();    /* typical stack declaration  */

struct    env_save  task_tab; /* environment save area declaration */

===
```

```
KERNEL function definitions


FUNCTION        void install(stack_bas, task, env_ptr)

                void (**stack_bas)(), (*task)();

                struct    env_save  *env_ptr;


PSEUDOCODE      move argument values to a safe area;

                save the callers CPU reg. SP in a safe area;

                set CPU reg. SP to stack_bas;

                push pointer to task on stack;

                push a dummy value for CPU reg. BC;  (BDS-C request)

                get current value of CPU reg. SP and save it in

                location task_tab.sptr_tab[task_tab.act_no];

                increment the value of "task_tab.act_no";

                restore the callers CPU reg. SP;

                and return to caller;  ( i.e. main(); )


FUNCTION        void start_sys(env_ptr)

                struct    env_save  *env_ptr;


PSEUDOCODE      get hold of the argument value;  (pointer to task_tab)

                check to see if current value of "task_tab.act_no"

                is less than "task_tab.max_no" else set it to 0;

                use "task_tab.act_no" as index to "task_tab.sptr_tab"

                and get that value into CPU reg. SP;

                pop the dummy value for CPU reg. BC;  (BDS-C request)

                return to (start) the selected task;


FUNCTION        void nexttask(env_ptr)

                struct    env_save  *env_ptr;

PSEUOOCODE      get hold of theargument value;  (pointer to task_tab)

                push CPU reg. SP on stack;  (BDS-C request)

                use "task_tab.act_no" as index to "task_tab.sptr_tab"

                and save CPU reg. SP in that location;

                increment "task_tab.act_no" and check if it's equal

                to "task_tab.max_no", if so set "task_tab.act_no" = 0;
```

```
                    use "task_tab.act_no" as index to "task_tab.sptr_tab"

                    and get that value into CPU reg. SP;

                    pop value for CPU reg. BC;  (BDS-C request)

                    return to next task in the ring;

;
; MODULE
;    kernel.csm
;
; CONTENTS
;    install(), startsys(), nexttask()
;
; DESCRIPTION
;    This three functions makes up the kernel routines
;    in a "Simple Multi Tasking System for CP/M-80"
;    Parts or all of this code may be used by anyone whithout
;    restrictions of any kind
;
; DESIGN
;    Roland Eriksson
;    Arbetshusgatan 58 A,  802 24  Gefle,  SWEDEN
;
; COMPILER
;    BDS C Vers 1.50a copyright Leor Zolman
;    BD Software, Inc.  P.O. Box 2368  Cambridge, MA 02238 U.S.A.
;
; PREPARATION
;    casm kernel.csm  ;asm preprocessor
;    asm kernel   ;actual assembly
;    cload kernel  ;CRL file generator
;

  INCLUDE  <bds.lib>

spsave  equ  uroom  ;temp storage for register SP
act$no$ptr equ  uroom + 2 ;temp storage for pointer to "task_tab.act_no"
tmp$act$no equ  uroom + 4 ;temp storage for "task_tab.act_no"


; Install task data in the multitasking structures

  FUNCTION install

   call arghak  ;stuff arguments away somewhere safe
   lxi  h,0   ;and save callers stackpointer
   dad  sp   ;for the duration of this function
   shld spsave

   lhld arg1  ;set up register SP to bottom
   sphl    ;of current install stack

   lhld arg2  ;get address of current install task
   push h   ;and put it on the stack
   lxi  h,0   ;push a dummy value for register BC
   push h   ;at activation time

   lhld arg3  ;get pointer to task_tab structure and
   inx  h   ;skip to "task_tab.act_no"

   inx  h
   shld act$no$ptr ;save a pointer to "task_tab.act_no"
   mov  e,m   ;get current value for "task_tab.act_no"
   inx  h   ;to register DE
   mov  d,m
   inx  h   ;finally point to "task_tab.sptrtbl[0]"
   dad  d   ;and use "task_tab.act_no" as offset to
   dad  d   ;correct instance of "sptrtbl"
   xchg    ;put new pointer in register DE
   inx  h   ;and increment "act_no"
```

```
   shld tmp$act$no ;store new "act_no" temporarily

   lxi  h,0   ;get current value from register SP
   dad  sp   ;and save it in the previously calculated
   xchg    ;instance of "task_tab.sptrtbl"
   mov  m,e
   inx  h
   mov  m,d

   lhld tmp$act$no ;get saved value for "act_no"
   xchg    ;to register DE
   lhld act$no$ptr ;get saved pointer to "task_tab.act_no"
   mov  m,e   ;and the new value in that location
   inx  h
   mov  m,d

   lhld spsave  ;retreive callers value for register SP
   sphl    ;and return to caller
   ret
ENDFUNCTION install

; Start the system at tasknumber according to "task_tab.act_no
; or at tasknumber 0 if "act_no" is out of range

  FUNCTION startsys

   call maitoh  ;get argument pointer to "task_tab"
   mov  e,m   ;and copy "task_tab.max_no" into
   inx  h   ;register DE
   mov  d,m
   inx  h   ;point to "task_tab.act_no"

   shld act$no$ptr ;and save that pointer for a while

   mov  a,m   ;copy "task_tab.act_no" into
   inx  h   ;register HL
   mov  h,m
   mov  l,a
   call cmphd  ;check if "act_no" is less than "max_no"
   jc  hld   ;and in that case JUMP
   lxi  h,0   ;else restart from tasknumber 0
hld:  xchg    ;put "act_no" in register DE
   lhld act$no$ptr ;and get the saved pointer
   mov  m,e   ;store the next value for "act_no"
   inx  h
   mov  m,d
   inx  h   ;and point to "task_tab.sptrtbl[0]"

   dad  d   ;use "act_no" as an index into the
   dad  d   ;"sptrtbl" vector
   mov  e,m   ;and fetch the value for register SP
   inx  h   ;to register DE
   mov  d,m
   xchg    ;and further into register HL and
   sphl    ;finally into register SP

   pop  b   ;pop the dummy value for register BC
   ret     ;and start the selected task

  ENDFUNCTION startsys


 ; Context save and switch routine when a task surrenders the CPU

  FUNCTION nexttask
```

```
     call maltoh  ;get argument pointer to "task_tab"
     push b   ;save register BC (Leor says so)

     mov  c,m   ;copy "task_tab.max_no" to register BC
     inx  h
     mov  b,m
     inx  h   ;point to "task_tab.act.no" and save
     shld act$no$ptr ;that pointer temporarily

     mov  e,m   ;get "task_tab.act_no" to register DE
     inx  h
     mov  d,m
     inx  h   ;and point to "task_tab.sptrtbl[0]", then
     dad  d   ;use "act_no" as an index into the
     dad  d   ;"sptrtbl" array
     xchg    ;exchange pointer and "act_no"
     inx  h   ;increment "act_no"
     shld tmp$act$no ;and store the new value for a while

     lxi  h,0   ;get hold of the current value of
     dad  sp   ;register SP and store it in it's
     xchg    ;proper position until next time we
     mov  m,e   ;whant to reactivate the current task
     inx  h
     mov  m,d

     mov  d,b   ;copy "task_tab.max_no" to register DE
     mov  e,c
     lhld tmp$act$no ;and get the new "act_no" into HL
     call cmphd  ;check if the new tasknumber is less than
     jc  gonext  ;"max_no" and in that case JUMP

     lxi  h,0   ;else start allover from tasknumber 0
gonext:  xchg    ;put next "act_no" in register DE
     lhld act$no$ptr ;get the saved pointer to "task_tab.act_no"
     mov  m,e   ;save new value for "act_no"
     inx  h
     mov  m,d
     inx  h   ;and point to the stackpointer table again
     dad  d   ;use the new "act_no" as an index to the
     dad  d   ;next SP value to reactivate
     mov  a,m   ;get that new value into register HL
     inx  h
     mov  h,m
     mov  l,a
     sphl    ;and further into register SP
     pop  b   ;restore register BC and run the
     ret     ;new task from where it last left off

    ENDFUNCTION nexttask

; EOF for "kernel.csm"

/*
 *  MODULE
 *              multitsk.h
 *
 *  CONTENTS
 *              global data definitions for "demo.c"
 *
 *  DESCRIPTION
 *              Data declarations for the demonstration program "demo.c"
 *              in "A Simple Multitasking System for CP/M-80"
 *              Parts or all of this code may be used by anyone whithout
 *              restrictions of any kind.
 *
 *  DESIGN
 *              Roland Eriksson
 *              Arbetshusgatan 58 A,  802 24  Gefle,  SWEDEN
 *
 *  COMPILER
 *              BDS C Vers 1.50a copyright Leor Zolman
 *              BD Software, Inc.  P.O. Box 2368  Cambridge, MA 02238 U.S.A.
 *
 *  PREPARATION
 *              include this file at compile time for "demo.c"
 */

#define     FOREVER     while(1)    /* just for some beauty */

#define     MAXTASK     3           /* total no. of defined tasks */

#define     STKLEN_0    1000        /* stack size definitions */
#define     STKLEN_1    1000
#define     STKLEN_2    1000

struct  env_save
(
    int     max_no;
    int     act_no;
    void    (**sptr_tab[MAXTASK])();
);

void    (*stack_0[STKLEN_0])();     /* actual stackspace declarations */
void    (*stack_1[STKLEN_1])();
void    (*stack_2[STKLEN_2])();

struct  env_save    task_tab;   /* house keeping and stackpointer save area */

/*  EOF for multitsk.h  */
/*
 *  PROGRAM
 *              demo.c
 *
 *  CONTENTS
 *              main(), task_0(), task_1(), task_2(), testfunc()
 *
 *  DESCRIPTION
 *              Demonstration program for the principles described in
 *              the article "A Simple Multitasking System for CP/M-80"
 *              Parts or all of this code may be used by anyone whithout
 *              restrictions of any kind.
 *
 *  DESIGN
 *              Roland Eriksson
 *              Arbetshusgatan 58 A,  802 24  Gefle,  SWEDEN
 *
 *  COMPILER
 *              BDS C Vers 1.50a copyright Leor Zolman
 *              BD Software, Inc.  P.O. Box 2368  Cambridge, MA 02238 U.S.A.
 *
 *  PREPARATION
 *              cc demo.c           (compile the source code)
 *              clink demo kernel   (link source to kernel library)
 */

#include    <bdscio.h>              /* standard header file */
#include    "multitsk.h"            /* multitasking definitions */

void    main()
(
    void    task_0(), task_1(), task_2();   /* external functions */

/*  initialize max no. of tasks and hereafter this item is READ-ONLY    */

    task_tab.max_no = MAXTASK;

/*  initialize this item to zero to start the installation      */
/*  at the beginning of the "spttr_tab" array                   */
```

```
    task_tab.act_no = 0;

/*  do the installation of each task in the order You decide, there is  */
/*  no connection betwheen the task name and the order of installation  */
/*  but the internal task identity number is assigned by the order of   */
/*  installation You choose.                                            */

    install(&stack_0[STKLEN_0], task_0, &task_tab);
    install(&stack_1[STKLEN_1], task_1, &task_tab);
    install(&stack_2[STKLEN_2], task_2, &task_tab);

/*  before You start the system You may assign a value of Your own  */
/*  to "task_tab.act_no" tomake the system start at a specific task */

/*  but if You leave it as is after installa ion then + e first in- */
/*  stalled task will automaticaly be the one that runs first.      */

    startsys(&task_tab);            /* finally start the system */

/*  this main routine is not used hereafter */

)

void    task_0()    /* You may choose any valid name You like   */
(
    do
    (

        printf("\n\nI'm in <task_0>, delay.....");
        sleep(30);
        printf("going to next task\n");
        nexttask(&task_tab);    /* here this task surrenders in favor of */
    )                           /* the other two, soon to be back here   */
    FOREVER;                    /* this is an infinite loop.....         */
)

void    task_1()
(
    do
    (

        puts("\ntask_1: in delay... ");
        sleep(30);
        testfunc("I'm reactivated in ");
    )
    FOREVER;                    /* this is allso an infinite loop.....  */
)

void    task_2()
(
    do
    (

        puts("\ntask_2: in delay... ");
        sleep(30);
        testfunc("I'm reactivated in ");
    )
    FOREVER;                    /* as is this */
)

void    testfunc(s)
char    *s;
(
    nexttask(&task_tab);
    puts("\ntestfunc: ");
    puts(s);
    printf("the environment of <task_%d> ", task_tab.act_no);
    sleep(30);
)
    /*  EOF for demo.c  */
```

Macintosh MacMand

by Jack Weber

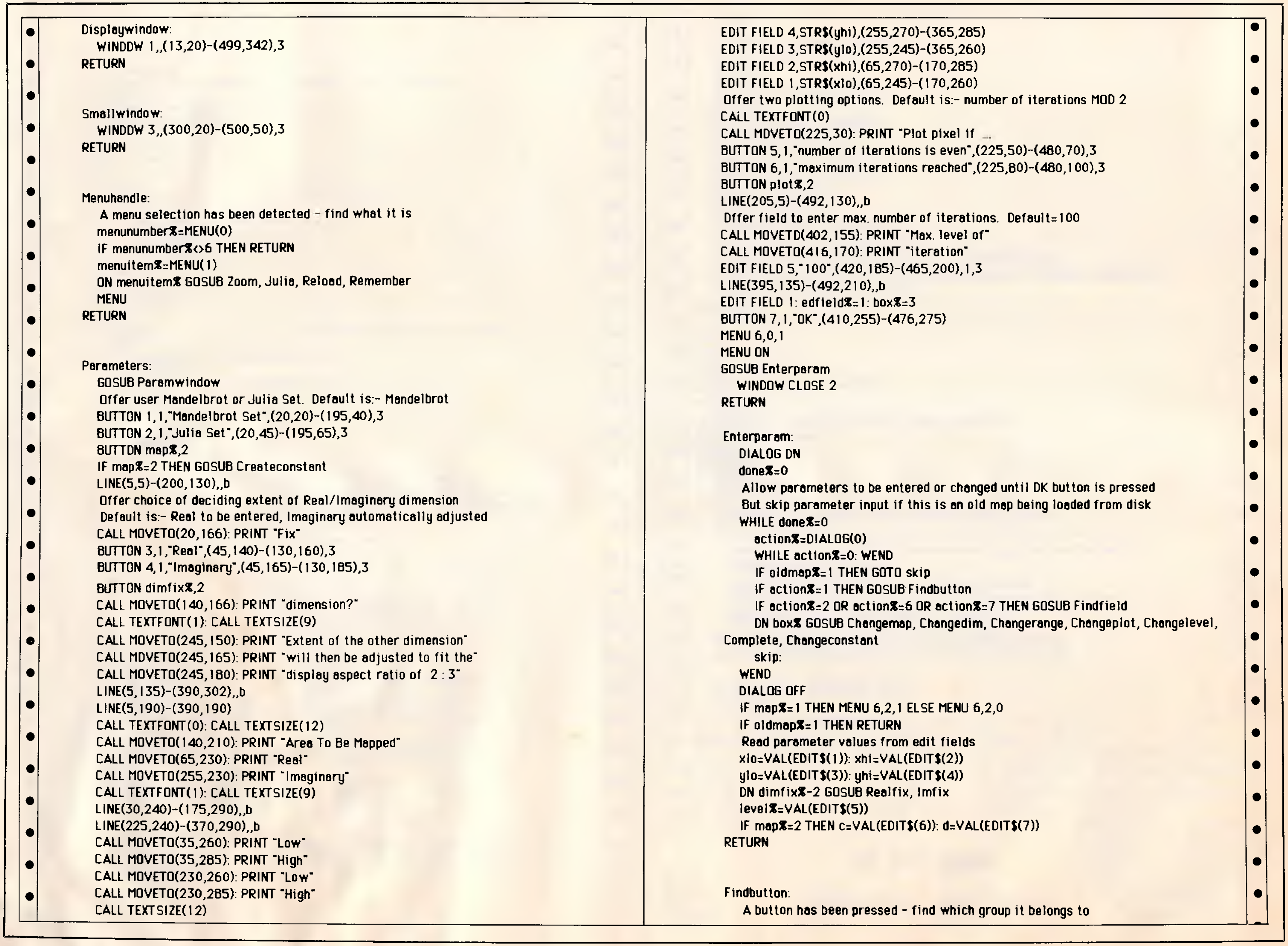
MICROTEX 666

This program is available electronically through Microtex 666's software downloading service. It is accessed through Viatel page *66637#.

This program accompanies the article on page 77 on fractals and Julia sets. A comprehensive explanation of how the program works is given in the text of the article and it's essential reading, particularly as it gives an insight into Jack Weber's excellent programming techniques.

The program is fully commented to aid translation to other computers, and a variable description list is included at the end.

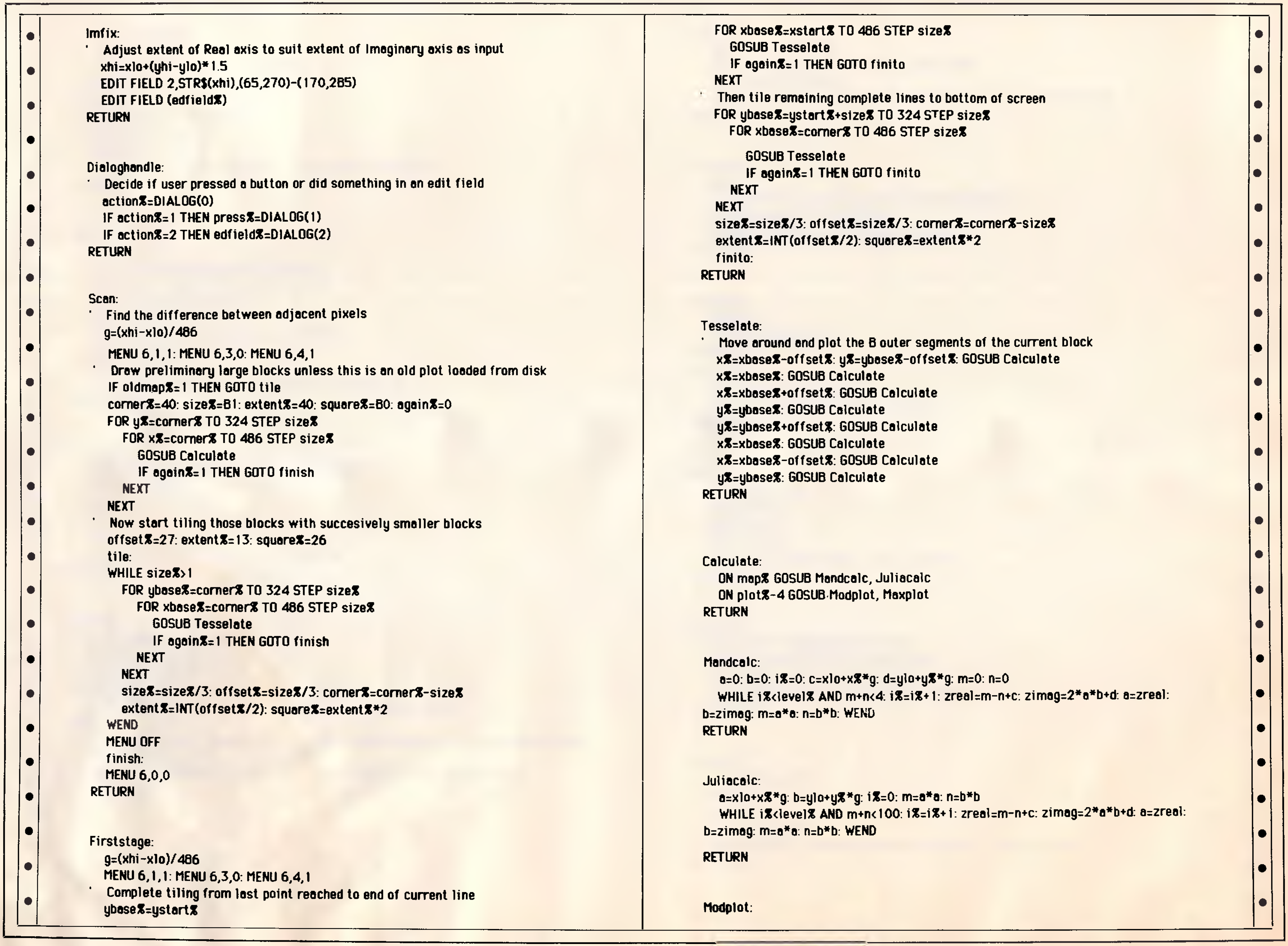
```
'   MacMand
'   © Jack Weber - Septemoer 1986
'
'   Plots the Mandelbrot Set and its surroundings in the k-plane
'   Plots the Julia Set in the z-plane for any complex value of k
'     drag mouse to select any region for zooming-in
'     point to select any spot in the k-plane to be mapped as a Julia set
'     automatically adjusts extent of map to fill screen
'     variable level of iteration
'     plots rate of divergence as alternate bands (MOD 2) or max value only
'   ------------------------------------------------------------------
'   This program runs on any Apple Macintosh under MS BASIC
'   ------------------------------------------------------------------
GOSUB Initialise
restart:
GOSUB Parameters
GOSUB Displaywindow
IF oldmap%=1 THEN GOSUB Mapload: GOSUB Firststage
GOSUB Scan
IF again%=1 THEN GOTO restart
GOSUB Finished
GOTO restart
END
'   ------------------------------------------------------------------
Initialise:
'   Provide default parameter settings
   map%=1: dimfix%=3: plot%=5: level%=100: edfield%=1: again%=0: oldmap%=0
'   Dimension arrays to save part & whole of display window
   DIM small%(405), screen%(10015)
'   Put display options in menu bar
   MENU 6,0,0,"Fractal"
   MENU 6,1,0,"Zoom-in"
   MENU 6,2,0,"Create Julia set "
   MENU 6,3,1,"Resume plot"
   MENU 6,4,0,"Save plot"
   ON MENU GOSUB Menuhandle
   MENU OFF
   ON DIALOG GOSUB Dialoghandle
   RETURN
   Paramwindow:
     WINDOW 2,,(6,27)-(504,334),2
   RETURN
```



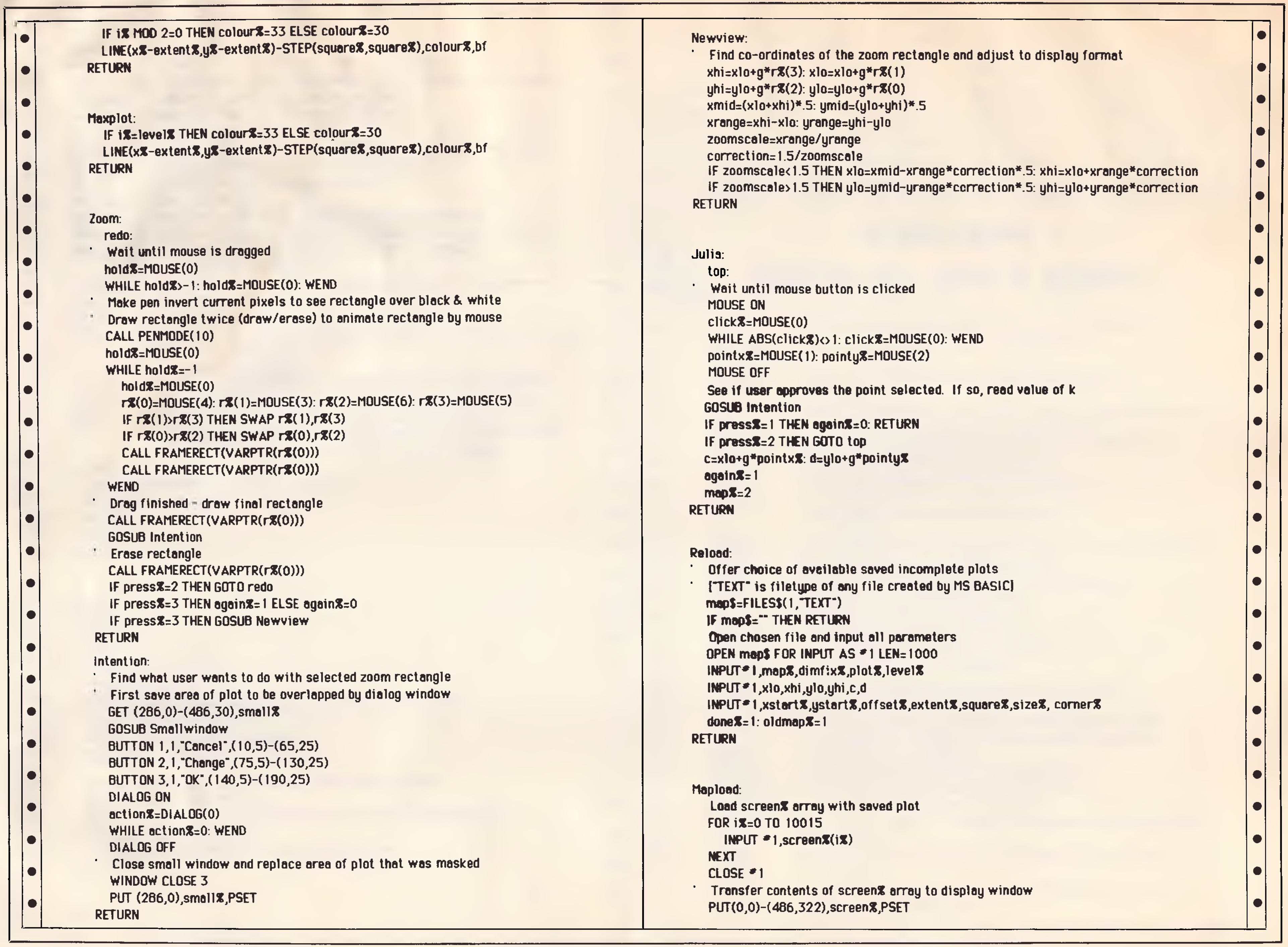
```
Displaywindow:
   WINDDW 1,,(13,20)-(499,342),3
RETURN


Smallwindow:
   WINDDW 3,,(300,20)-(500,50),3
RETURN


Menuhandle:
    A menu selection has been detected - find what it is
   menunumber%=MENU(0)
   IF menunumber%<>6 THEN RETURN
   menuitem%=MENU(1)
   ON menuitem% GOSUB Zoom, Julia, Reload, Remember
   MENU
RETURN


Parameters:
   GOSUB Paramwindow
    Offer user Mandelbrot or Julia Set.  Default is:- Mandelbrot
   BUTTON 1,1,"Mandelbrot Set",(20,20)-(195,40),3
   BUTTON 2,1,"Julia Set",(20,45)-(195,65),3
   BUTTDN map%,2
   IF map%=2 THEN GOSUB Createconstant
   LINE(5,5)-(200,130),,b
    Offer choice of deciding extent of Real/Imaginary dimension
    Default is:- Real to be entered, Imaginary automatically adjusted
   CALL MOVETO(20,166): PRINT "Fix"
   BUTTON 3,1,"Real",(45,140)-(130,160),3
   BUTTON 4,1,"Imaginary",(45,165)-(130,185),3
   BUTTON dimfix%,2
   CALL MOVETO(140,166): PRINT "dimension?"
   CALL TEXTFONT(1): CALL TEXTSIZE(9)
   CALL MOVETO(245,150): PRINT "Extent of the other dimension"
   CALL MDVETO(245,165): PRINT "will then be adjusted to fit the"
   CALL MOVETO(245,180): PRINT "display aspect ratio of  2 : 3"
   LINE(5,135)-(390,302),,b
   LINE(5,190)-(390,190)
   CALL TEXTFONT(0): CALL TEXTSIZE(12)
   CALL MOVETO(140,210): PRINT "Area To Be Mapped"
   CALL MOVETO(65,230): PRINT "Real"
   CALL MOVETO(255,230): PRINT "Imaginary"
   CALL TEXTFONT(1): CALL TEXTSIZE(9)
   LINE(30,240)-(175,290),,b
   LINE(225,240)-(370,290),,b
   CALL MOVETO(35,260): PRINT "Low"
   CALL MOVETO(35,285): PRINT "High"
   CALL MOVETO(230,260): PRINT "Low"
   CALL MOVETO(230,285): PRINT "High"
   CALL TEXTSIZE(12)
```

```
   EDIT FIELD 4,STR$(yhi),(255,270)-(365,285)
   EDIT FIELD 3,STR$(ylo),(255,245)-(365,260)
   EDIT FIELD 2,STR$(xhi),(65,270)-(170,285)
   EDIT FIELD 1,STR$(xlo),(65,245)-(170,260)
    Offer two plotting options.  Default is:- number of iterations MOD 2
   CALL TEXTFONT(0)
   CALL MDVETO(225,30): PRINT "Plot pixel if ...
   BUTTON 5,1,"number of iterations is even",(225,50)-(480,70),3
   BUTTON 6,1,"maximum iterations reached",(225,80)-(480,100),3
   BUTTON plot%,2
   LINE(205,5)-(492,130),,b
    Dffer field to enter max. number of iterations.  Default=100
   CALL MOVETD(402,155): PRINT "Max. level of"
   CALL MOVETO(416,170): PRINT "iteration"
   EDIT FIELD 5,"100",(420,185)-(465,200),1,3
   LINE(395,135)-(492,210),,b
   EDIT FIELD 1: edfield%=1: box%=3
   BUTTON 7,1,"OK",(410,255)-(476,275)
   MENU 6,0,1
   MENU ON
   GOSUB Enterparam
      WINDOW CLOSE 2
   RETURN

    Enterparam:
      DIALOG DN
      done%=0
       Allow parameters to be entered or changed until DK button is pressed
       But skip parameter input if this is an old map being loaded from disk
      WHILE done%=0
         action%=DIALOG(0)
         WHILE action%=0: WEND
         IF oldmap%=1 THEN GOTO skip
         IF action%=1 THEN GOSUB Findbutton
         IF action%=2 OR action%=6 OR action%=7 THEN GOSUB Findfield
         DN box% GOSUB Changemap, Changedim, Changerange, Changeplot, Changelevel,
    Complete, Changeconstant
         skip:
      WEND
      DIALOG OFF
      IF map%=1 THEN MENU 6,2,1 ELSE MENU 6,2,0
      IF oldmap%=1 THEN RETURN
       Read parameter values from edit fields
      xlo=VAL(EDIT$(1)): xhi=VAL(EDIT$(2))
      ylo=VAL(EDIT$(3)): yhi=VAL(EDIT$(4))
      DN dimfix%-2 GOSUB Realfix, Imfix
      level%=VAL(EDIT$(5))
      IF map%=2 THEN c=VAL(EDIT$(6)): d=VAL(EDIT$(7))
    RETURN


    Findbutton:
       A button has been pressed - find which group it belongs to
```

```
        IF press%<3 THEN box%=1
        IF press%=3 OR press%=4 THEN box%=2
        IF press%=5 OR press%=6 THEN box%=4
        IF press%=7 THEN box%=6
    RETURN


    Findfield:
    Something happened in an edit field - find what and select required field
    IF action%=2 THEN EDIT FIELD edfield%
    IF action%>5 AND box%=3 THEN EDIT FIELD ((edfield% MOD 4)+1): edfield%=(edfield%
MOD 4)+1
    IF action%>5 AND box%=7 THEN EDIT FIELD (7-(edfield% MOD 2)):
edfield%=(7-edfield% MOD 2)
    IF edfield%<5 THEN box%=3
    IF edfield%=5 THEN box%=5
    IF edfield%>5 THEN box%=7
RETURN


Changemap:
'   User selected type of Set - find which one
    map%=press%
    lobutton%=1
    hibutton%=2
    GOSUB Setbutton
    ON map% GOSUB Clearconstant, Createconstant
RETURN


Createconstant:
'   Julia Set selected so allow entry of the constant - k
    CALL TEXTSIZE(9)
    CALL MOVETO(20,93): PRINT "k Real"
    CALL MOVETO(20,118): PRINT "k Imaginary"
    CALL TEXTSIZE(12)
    LINE(15,75)-(190,125),,b
    EDIT FIELD 7,STR$(d),(80,105)-(185,120)
    EDIT FIELD 6,STR$(c),(80,80)-(185,95)
    box%=7
RETURN


Clearconstant:
     Mandelbrot Set selected so get rid of fields for entering k
    EDIT FIELD CLOSE 6
    EDIT FIELD CLOSE 7
    LINE(15,75)-(190,125),30,bf
RFTIIRN
Changeconstant:
'    User changed value of k - update it
    c=VAL(EDIT$(6))
    d=VAL(EDIT$(7))
RETURN


Changedim:
'   User selected dimension to be fixed by input - find which one
    dimfix%=press%
    lobutton%=3
    hibutton%=4
    GOSUB Setbutton
RETURN


Changerange:
'   User changed value of plot extent - update it
    xlo=VAL(EDIT$(1)): xhi=VAL(EDIT$(2))
    ylo=VAL(EDIT$(3)): yhi=VAL(EDIT$(4))
    ON dimfix%-2 GOSUB Realfix, Imfix
RETURN


Changeplot:
'   User entered type of plot - find which one
    plot%=press%
    lobutton%=5
    hibutton%=6
    GOSUB Setbutton
RETURN


Changelevel:
'   Level of iteration changed - update it
    level%=VAL(EDIT$(5))
RETURN
Complete:
'   OK button pressed
    done%=1
RETURN


Setbutton:
'   Toggle buttons within the current group
    FOR i%=lobutton% TO hibutton%
        IF press%=i% THEN BUTTON i%,2 ELSE BUTTON i%,1
    NEXT
RETURN


Realfix:
'   Adjust extent of Imaginary axis to suit extent of Real axis as input
    yhi=ylo+(xhi-xlo)*2/3
    EDIT FIELD 4,STR$(yhi),(255,270)-(365,285)
    EDIT FIELD (edfield%)
RETURN
```



```
Imfix:
'  Adjust extent of Real axis to suit extent of Imaginary axis as input
   xhi=xlo+(yhi-ylo)*1.5
   EDIT FIELD 2,STR$(xhi),(65,270)-(170,285)
   EDIT FIELD (edfield%)
RETURN


Dialoghandle:
'  Decide if user pressed a button or did something in an edit field
   action%=DIALOG(0)
   IF action%=1 THEN press%=DIALOG(1)
   IF action%=2 THEN edfield%=DIALOG(2)
RETURN


Scan:
'  Find the difference between adjacent pixels
   g=(xhi-xlo)/486
   MENU 6,1,1: MENU 6,3,0: MENU 6,4,1
'  Draw preliminary large blocks unless this is an old plot loaded from disk
   IF oldmap%=1 THEN GOTO tile
   corner%=40: size%=81: extent%=40: square%=80: again%=0
   FOR y%=corner% TO 324 STEP size%
      FOR x%=corner% TO 486 STEP size%
         GOSUB Calculate
         IF again%=1 THEN GOTO finish
      NEXT
   NEXT
'  Now start tiling those blocks with succesively smaller blocks
   offset%=27: extent%=13: square%=26
   tile:
   WHILE size%>1
      FOR ybase%=corner% TO 324 STEP size%
         FOR xbase%=corner% TO 486 STEP size%
            GOSUB Tesselate
            IF again%=1 THEN GOTO finish
         NEXT
      NEXT
      size%=size%/3: offset%=size%/3: corner%=corner%-size%
      extent%=INT(offset%/2): square%=extent%*2
   WEND
   MENU OFF
   finish:
   MENU 6,0,0
RETURN


Firststage:
   g=(xhi-xlo)/486
   MENU 6,1,1: MENU 6,3,0: MENU 6,4,1
'  Complete tiling from last point reached to end of current line
   ybase%=ystart%
   FOR xbase%=xstart% TO 486 STEP size%
      GOSUB Tesselate
      IF again%=1 THEN GOTO finito
   NEXT
'  Then tile remaining complete lines to bottom of screen
   FOR ybase%=ystart%+size% TO 324 STEP size%
      FOR xbase%=corner% TO 486 STEP size%

         GOSUB Tesselate
         IF again%=1 THEN GOTO finito
      NEXT
   NEXT
   size%=size%/3: offset%=size%/3: corner%=corner%-size%
   extent%=INT(offset%/2): square%=extent%*2
   finito:
RETURN


Tesselate:
'  Move around and plot the 8 outer segments of the current block
   x%=xbase%-offset%: y%=ybase%-offset%: GOSUB Calculate
   x%=xbase%: GOSUB Calculate
   x%=xbase%+offset%: GOSUB Calculate
   y%=ybase%: GOSUB Calculate
   y%=ybase%+offset%: GOSUB Calculate
   x%=xbase%: GOSUB Calculate
   x%=xbase%-offset%: GOSUB Calculate
   y%=ybase%: GOSUB Calculate
RETURN



Calculate:
   ON map% GOSUB Mandcalc, Juliacalc
   ON plot%-4 GOSUB Modplot, Maxplot
RETURN


Mandcalc:
   a=0: b=0: i%=0: c=xlo+x%*g: d=ylo+y%*g: m=0: n=0
   WHILE i%<level% AND m+n<4: i%=i%+1: zreal=m-n+c: zimag=2*a*b+d: a=zreal:
b=zimag: m=a*a: n=b*b: WEND
RETURN


Juliacalc:
   a=xlo+x%*g: b=ylo+y%*g: i%=0: m=a*a: n=b*b
   WHILE i%<level% AND m+n<100: i%=i%+1: zreal=m-n+c: zimag=2*a*b+d: a=zreal:
b=zimag: m=a*a: n=b*b: WEND

RETURN


Modplot:
```



```
    IF i% MOD 2=0 THEN colour%=33 ELSE colour%=30
    LINE(x%-extent%,y%-extent%)-STEP(square%,square%),colour%,bf
  RETURN


  Maxplot:
    IF i%=level% THEN colour%=33 ELSE colour%=30
    LINE(x%-extent%,y%-extent%)-STEP(square%,square%),colour%,bf
  RETURN


  Zoom:
    redo:
'    Wait until mouse is dragged
    hold%=MOUSE(0)
    WHILE hold%>-1: hold%=MOUSE(0): WEND
'    Make pen invert current pixels to see rectangle over black & white
'    Draw rectangle twice (draw/erase) to animate rectangle by mouse
    CALL PENMODE(10)
    hold%=MOUSE(0)
    WHILE hold%=-1
      hold%=MOUSE(0)
      r%(0)=MOUSE(4): r%(1)=MOUSE(3): r%(2)=MOUSE(6): r%(3)=MOUSE(5)
      IF r%(1)>r%(3) THEN SWAP r%(1),r%(3)
      IF r%(0)>r%(2) THEN SWAP r%(0),r%(2)
      CALL FRAMERECT(VARPTR(r%(0)))
      CALL FRAMERECT(VARPTR(r%(0)))
    WEND
'    Drag finished - draw final rectangle
    CALL FRAMERECT(VARPTR(r%(0)))
    GOSUB Intention
'    Erase rectangle
    CALL FRAMERECT(VARPTR(r%(0)))
    IF press%=2 THEN GOTO redo
    IF press%=3 THEN again%=1 ELSE again%=0
    IF press%=3 THEN GOSUB Newview
  RETURN

  Intention:
'    Find what user wants to do with selected zoom rectangle
'    First save area of plot to be overlapped by dialog window
    GET (286,0)-(486,30),small%
    GOSUB Smallwindow
    BUTTON 1,1,"Cancel",(10,5)-(65,25)
    BUTTON 2,1,"Change",(75,5)-(130,25)
    BUTTON 3,1,"OK",(140,5)-(190,25)
    DIALOG ON
    action%=DIALOG(0)
    WHILE action%=0: WEND
    DIALOG OFF
'    Close small window and replace area of plot that was masked
    WINDOW CLOSE 3
    PUT (286,0),small%,PSET
  RETURN
```

```
Newview:
'  Find co-ordinates of the zoom rectangle and adjust to display format
  xhi=xlo+g*r%(3): xlo=xlo+g*r%(1)
  yhi=ylo+g*r%(2): ylo=ylo+g*r%(0)
  xmid=(xlo+xhi)*.5: ymid=(ylo+yhi)*.5
  xrange=xhi-xlo: yrange=yhi-ylo
  zoomscale=xrange/yrange
  correction=1.5/zoomscale
  IF zoomscale<1.5 THEN xlo=xmid-xrange*correction*.5: xhi=xlo+xrange*correction
  IF zoomscale>1.5 THEN ylo=ymid-yrange*correction*.5: yhi=ylo+yrange*correction
RETURN


Julia:
  top:
'  Wait until mouse button is clicked
  MOUSE ON
  click%=MOUSE(0)
  WHILE ABS(click%)<>1: click%=MOUSE(0): WEND
  pointx%=MOUSE(1): pointy%=MOUSE(2)
  MOUSE OFF
  See if user approves the point selected.  If so, read value of k
 GOSUB Intention
 IF press%=1 THEN again%=0: RETURN
 IF press%=2 THEN GOTO top
 c=xlo+g*pointx%: d=ylo+g*pointy%
 again%=1
 map%=2
RETURN


Reload:
'  Offer choice of available saved incomplete plots
'  ["TEXT" is filetype of any file created by MS BASIC]
  map$=FILES$(1,"TEXT")
  IF map$="" THEN RETURN
  Open chosen file and input all parameters
  OPEN map$ FOR INPUT AS #1 LEN=1000
  INPUT#1,map%,dimfix%,plot%,level%
  INPUT#1,xlo,xhi,ylo,yhi,c,d
  INPUT#1,xstart%,ystart%,offset%,extent%,square%,size%, corner%
  done%=1: oldmap%=1
RETURN


Mapload:
   Load screen% array with saved plot
  FOR i%=0 TO 10015
    INPUT #1,screen%(i%)
  NEXT
  CLOSE #1
'  Transfer contents of screen% array to display window
  PUT(0,0)-(486,322),screen%,PSET
```

```
RETURN


Remember:
'  Transfer whole of display window into screen% array
   GET (0,0)-(486,322),screen%
'  Ask user for a file name.  Save parameters followed by screen% array
   map$=FILES$(0,"Save map as ...")
   IF map$="" THEN PUT (0,0)-(486,322),screen%,PSET: RETURN

   OPEN map$ FOR OUTPUT AS #1 LEN=1000
   WRITE#1,map%,dimfix%,plot%,level%
   WRITE#1,xlo,xhi,ylo,yhi,c,d
   WRITE#1,xbase%,ybase%,offset%,extent%,square%,size%,corner%
   FOR i%=0 TO 10015
      WRITE#1,screen%(i%)
   NEXT
   CLOSE #1
   END
RETURN


Finished:
   MENU 6,0,1
   MENU ON
   menunumber%=MENU(0)
   WHILE meunumber%=0: WEND
RETURN
```

a	Temporary variable holding Real part of z during iteration
action%	Number returned by Dialog function showing type of last user action
again%	Flag - set to 1 if this is modified plot (initialisation already done)
b	Temporary variable holding Imaginary part of z during iteration
box%	Number of box containing buttons/edit fields currently selected in Parameter window
c	Real part of constant k
click%	Number returned by Mouse function indicating if mouse button pressed
colour%	30=white, 33=black
corner%	Co-ordinate of centre pixel in current top-left square
correction	Correction factor to adjust zoom rectangle to screen format
d	Imaginary part of constant k
dimfix%	Dimension to be entered by user - 3=Real, 4=Imaginary
Jone%	Flag - set to 1 when OK button is pressed in Parameter window
edfield%	Currently selected edit field in the Parameter window
extent%	Half-size of current tiles
g	Step in value between adjacent pixels
hibutton%	Number of highest button in current group
hold%	Number returned by Mouse function to show state of mouse button
i%	General purpose loop counter
level%	Maximum number of iterations to be done
lobutton%	Number of lowest button in current group
m	Temporary variable holding square of Real part of z during iteration
map%	Type of plot - 1=Mandelbrot set, 2=Julia set
map$	Filename for saved plot
menuitem%	Number of item in menu selection
menunumber%	Number of menu bar selection
n	Temporary variable holding square of Imaginary part of z during iteration
offset%	Distance from centre pixel of current square to centre pixel of current tile
oldmap%	Flag - set to 1 if this is a partially completed plot loaded from disk
plot%	Plotting mode - 5=odd/even, 6=max value
pointx%	X co-ordinate where mouse button was clicked
pointy%	Y co-ordinate where mouse button was clicked
press%	Number of button last pressed
r%	Array holding co-ordinates of rectangle dragged with mouse
screen%	Array to hold whole of screen when saving/loading from disk
size%	Size of current squares
small%	Array to hold part of screen obscured by small window
square%	Size of current tiles (= 2*extent%)
x%	X co-ordinate of centre pixel in current tile
xbase%	X co-ordinate of centre pixel in current square
xhi	High value of Real dimension displayed
xlo	Low value of Real dimension displayed
xmid	Value of Real dimension at centre of zoom rectangle
xrange	Extent of Real dimension of zoom rectangle
xstart%	X co-ordinate of centre pixel in square where plot was interrupted to save to disk
y%	Y co-ordinate of centre pixel in current tile
ybase%	Y co-ordinate of centre pixel in current square
yhi	High value of Imaginary dimension displayed
ylo	Low value of Imaginary dimension displayed
ymid	Value of Imaginary dimension at centre of zoom rectangle
yrange	Extent of Imaginary dimension of zoom rectangle
ystart%	Y co-ordinate of centre pixel in square where plot was interrupted to save to disk
zimag	Temporary variable holding new value of Real part of z
zoomscale	Ratio of Real:Imaginary extent of zoom rectangle
zreal	Temporary variable holding new value of Imaginary part of z

---

Amstrad CPC Trace in Windows

by Jeffrey Weaver

This program allows the user to display the line numbers produced by the tracer to be printed in certain text windows or dumped to a printer. When the Control and Tab keys are pressed, the program being executed is halted until the keys are released.

To use the program, type it in as listed and save it; then run it. The program will set HIMEM and then POKE-in the machine code. It will ask for a stream number in the range 0–8. 0–7 are text windows and 8 is the printer. The computer then asks for the size of the window and its position. When the window size has been entered, the Basic program deletes itself and the computer can be used as normal; but when TRON or TROFF are typed, they act on the new trace program.

```
10 PAPER 0:PEN 1:MODE 1:INK 0,0:BORDER 0
20 MEMORY 39999:RESTORE:FOR F=40000 TO 40255:READ A$:POKE F,VAL("&"+A$):NEXT F
30 PRINT "PLEASE SELECT WINDOW NUMBER (0-8)":PRINT:PRINT"0-7 ARE TEXT WINDOWS AN
D 8 SENDS THE":PRINT:PRINT"LINE NUMBERS TO THE PRINTER.":PRINT:INPUT "NUMBER ":S
T
40 IF ST<0 OR ST>8 THEN ST=8
50 PRINT:INPUT "LEFT COLUMN OF WINDOW ";L
60 PRINT:INPUT "RIGHT COLUMN OF WINDOW ";R
70 PRINT:INPUT "TOP ROW OF WINDOW ";T
80 PRINT:INPUT "LOWER ROW OF WINDOW ";W
90 POKE 40248,ST:POKE 40189,L:POKE 40191,R:POKE 40193,T:POKE 40195,W
100 CLS:CALL 40000:PRINT "NEW TRACE ROUTINE IS NOW READY.":NEW
110 DATA 3E,C3,21,4C,9C,32,5A,BB,22,5B,BB,C9,CD, 8F,9C,CD,9E,9C,CA,B1,9C,3A,3D,9
D,FE,0,C2,BE,9C,3A,31,9D,FE,5B,C2,B1,9C,3A,38,9D,FE,8,D2,87,9C,3A,3A,9D,4F,CD,11
,BC,B9,C4,F5,9C,CD,78,BB,22,3B,9D,3A,38,9D,CD,B4,BB,32,39,9D,3E,1,32,3D,9D,C3,A4
,9C,32,31
120 DATA 9D,ED,43,32,9D,ED,53,34,9D,22,36,9D,C9,3A,38,AE,FE,0,C9,3A,31,9D,ED,32,
9D,ED,34,9D,2A,36,9D,C9,3A,31,9D,CD,BA,9C,C3,A4,9C,CF,0,94,C9,3A,38,9D,FE,8,D2,1
2,9D,3A,31,9D,FE,5D,C2,81,9C,3E,20,32,31,9D,CD, B1,9C,3A,39,9D,CD,B4,BB,2A,3B,9D
,CD,75
130 DATA BB,3E,0,32,3D,9D,3E,44,CD,1E,BB,28,4,CB,79,20,F5,C3,A4,9C,3A,38,9D,CD,B
4,BB,F5, 26,1,16,14,2E,1,1E,3,CD,66,BD,F1,CD,B4, BB,CD,11,BC,32,3A,9D,C9,3A,31,9
D,FE,5D, 28,8,3A,31,9D,CD,28,BD,30,FB,C3,A4,9C,3E,20,CD,28,8D,3E,0,32,3D,9D,C3,A
4,9C,0,0
140 DATA 0,0,0,0,0,7,0,3,0,0,0,0,0
```

BBC Interrupt-Driven Clock

by Alan Potton

MICROTEX 666

This program is available electronically through Microtex 666's software downloading service. It is accessed through Viatel page *66637#

This program provides a real-time clock and alarm facility on the BBC Micro. The program should be typed-in as it stands, substituting all pound signs (£) for hashes (#). There are four possible alterations. The user could change the loop in line 1040 to run from 1 to 3 rather than 0 to 2, in order to check for errors in the assembly language the first time the program is run, and then change it back when all is OK. Secondly, the machine code can be relocated by changing the value of P% in line 1050 and the two old values in line 2740. The current setting of &1700 is for use with a disk system; for a cassette system, use &B00. Thirdly, the coordinates on the screen where the time is to be printed may be altered in line 1350. Finally, if the user has other events enabled, remove the two slashes in line 1880.

When the program has been typed-in, save it then run it. The machine code will be installed and a prompt for the time will be given: it should be entered in the format hh:mm. Then the alarm time is requested and given in the same format. The Basic program is erased using the NEW command. There are three * commands to use the new clock:

*ZINITCL — this *must* be entered to initialise and start the clock running. It need only be typed once, and to ensure correctness, must be typed at the time entered at the prompt.

*ZDISP ON/OFF — this command switches the display of the clock onscreen on and off.

The default is off.

*ZALM ON/OFF — this command switches the alarm on and off. If it's on and the alarm time is reached, it will ring. When off, the alarm will not sound.

The program is made up of two parts of machine code and one of Basic. The first machine code routine in lines 1080 to 1840 adds three new OS commands. Lines 1080 to 1190 provide the new service routine to access the new commands.

The clock works using the count-down timer (using the OSWORD routine with A=4) on a one-minute cycle. When the interrupt signal is produced, control jumps to the User Interrupt Service Routine. The routine increments the clock, displays the time and checks for the alarm. The address of the routine is given to the operating system in lines 1330 and 1340.

```
1000 MODE3
1010 w=&FFF1
1020 b=&FFF4
1030 a=&FFE3
1040 FOR L%=0 TO 2 STEP 2
1050   P%=&1700
1060(  [opt L%
1070
1080   .cli
1090   pha:txa:pha:tya:pha
1100   stx &80:sty &81
1110
1120   ldy £1:lda (&80),Y:ora £32:tax
1130   ldy £2:lda (&80),Y:ora £32:tay
1140   cpx £ASC"z":bne mark0
1150   cpy £ASC"i":beq zinitcl
1160   cpy £ASC"d":beq zdisp
1170   cpy £ASC"a":beq zalm
1180   .mark0
1190   jmp zdef
1200
1210   .zalm
1220   jmp za
1230
1240   .zinitcl
1250   lda £0:sta &75
1260   lda £0:sta &78
1270   lda £&86:sta &79
1280   lda £&E8:sta &7A
1290   lda £&FF:sta &7B
1300   sta &7C:sta &7D
1310   lda £4:ldx £&79:ldy £0:jsr w
1320   lda £14:ldx £5:jsr b
1330   lda £int MOD 256:sta &220
1340   lda £int DIV 256:sta &221
1350   lda,£70:sta &7E:lda £00:sta &7F
1360   lda £01:sta &88
1370   lda £00:sta &89
1380   lda £&F1:sta &8A
1390   lda £&FF:sta &8B
1400   lda £&C8:sta &8C
1410   lda £00:sta &8D
1420   lda £&80:sta &8E
1430   lda £00:sta &8F
1440   jmp ex
1450
1460   .zdisp
1470   ldy £8:lda (&80),Y:ora £32
1480   cmp £ASC"n":bne dpoff
1490
1500   .on
1510   lda £1:sta &78
1520   jsr print
1530   jmp ex
1540
1550   .dpoff
1560   lda £0:sta &78
1570   lda £134:jsr b:stx &76:sty &77
1580   lda £31:jsr a
1590   lda &7E:jsr a:lda &7F:jsr a
1600   lda £32:jsr a:jsr a:jsr a:jsr a:jsr a
1610   lda £31:jsr a
1620   lda &76:jsr a
1630   lda &77:jsr a
```

```
1640   jmp ex
1650
1660   .za
1670   ldv £7:lda (&80).Y
1680   cmp £ASC"f":beq aloff
1690
1700   .alon
1710   lda £1:sta &75
1720   jmp ex
1730
1740   .aloff
1750   lda £0:sta &75
1760   jmp ex
1770
1780   .zdef
1790   pla:tav:pla:tax:pla
1800   jmp ?&208+&100*?&209
1810
1820   .ex
1830   pla:tay:pla:tax:pla
1840   rts
1850
1860   .int
1870   pha:txa:pha:tya:pha:php:clc
1880   \cmp £5:\bne exit
1890   lda £4:ldx £&79:ldy £0:jsr w
1900   lda &74
1910   clc:adc £1
1920   cmp £58:beq incmt
1930   sta &74
1940
1950   .cont
1960   lda &78
1970   cmp £1:beq cp
1980   .cont2
1990   lda &75
2000   cmp £1:beq sound
2010
2020   .exit
2030   plp:pla:tay:pla:tax:pla
2040   rts
2050
2060   .cp
2070   jsr print
2080   jmp cont2
2090
2100   .sound
2110   jsr sdal
2120   jmp exit
2130
2140   .incmt
2150   lda £48:sta &74
2160   lda &73:clc:adc £1
2170   cmp £54:beq inch
2180   sta &73
2190   jmp cont
2200
2210   .inch
2220   lda £48:sta &73
2230   lda &71:clc:adc £1
2240   cmp £52:beq hu4
2250   .mark
2260   cmp £58:beq hu10
2270   sta &71
2280   jmp cont
2290
2300   .hu4
2310   lda &70:cmp £2:bne mark
2320   lda £48:sta &71:sta &70
2330   jmp cont
2340
2350   .hu10
```

```
2360   lda £48:sta &71
2370   lda &70:clc:adc £1:sta &70
2380   jmp cont
2390
2400   .print
2410      lda £134:jsr b
2420   stx &76
2430   stv &77
2440   lda £31:jsr a
2450   lda &7E:jsr a
2460   lda &7F:jsr a
2470   ldv £0
2480   .loop
2490   lda &70.Y:jsr a:iny
2500   cpv £5:bne loop
2510
2520   lda £31:jsr a
2530   lda &76:jsr a
2540   lda &77:jsr a
2550   rts
2560
2570   .sdal
2580   lda &70:cmp &82
2590   bne ret
2600   lda &71:cmp &83
2610   bne ret
2620   lda &73:cmp &85
2630   bne ret
2640   lda &74:cmp &86
2650   bne ret
2660   .snd
2670   lda £7:ldx £&88:ldy £0
2680   jsr w
2690   .ret
2700   rts
2710
2720   ]
2730   NEXT L%
2740 ?&208=&1700 MOD 256:?&209=&1700 DIV 256
2750 PROCINST
2760 END
2770 DEFPROCINST
2780 CLS
2790 INPUT "Clock Time : ",TM$
2800 FOR CT%=&70 TO &74
2810   ?CT%=ASC(MID$(TM$,CT%-&6F,1))
2820   NEXT
2830 PRINT:PRINT"      *ZINITCL - Initialise and start clock"'"
  - Switch display on/off"
2840 PRINT
2850 INPUT "Alarm Time : ",TM$
2860 FOR CT%=&82 TO &86
2870   IF CT%=&84 THEN GOTO 2890
2880   ?CT%=ASC(MID$(TM$,CT%-&81,1))
2890   NEXT
2900 PRINT:PRINT"      *ZALM ON/OF - Switch alarm on/off"
2910 ENDPROC
```

Amstrad PCW8256 GSX Graphics Shell

by J O'Regan

This program allows you to make use of GSX graphics within a Basic program. To use the program, you *must* have the GSX extension installed with Basic. This loads into memory along with Basic and displays a message saying so. The program itself allows easy use of GSX graphics without having to use complex codes.

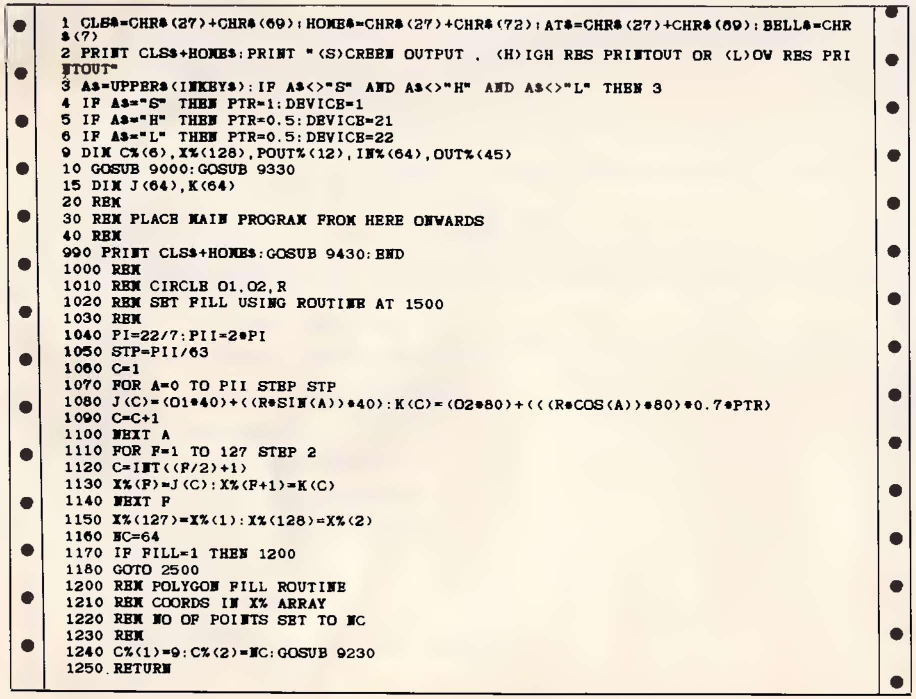
The program installs a set of graphics subroutines which are then available to the Basic program. Before the routines can be used, a disk must be set up containing the various drivers and Basic with the GSX extension. Details of this are given in an article about GSX graphics published in the July issue of *APC*.

A demonstration program to make use of the subroutines is also included so that users can see how to incorporate the routines into their own programs. One half of the routines are necessary in all programs to set up the GSX workstations. These routines are essential and must appear in all programs before the graphic routines can be used. The short control program is also necessary to initialise variables.

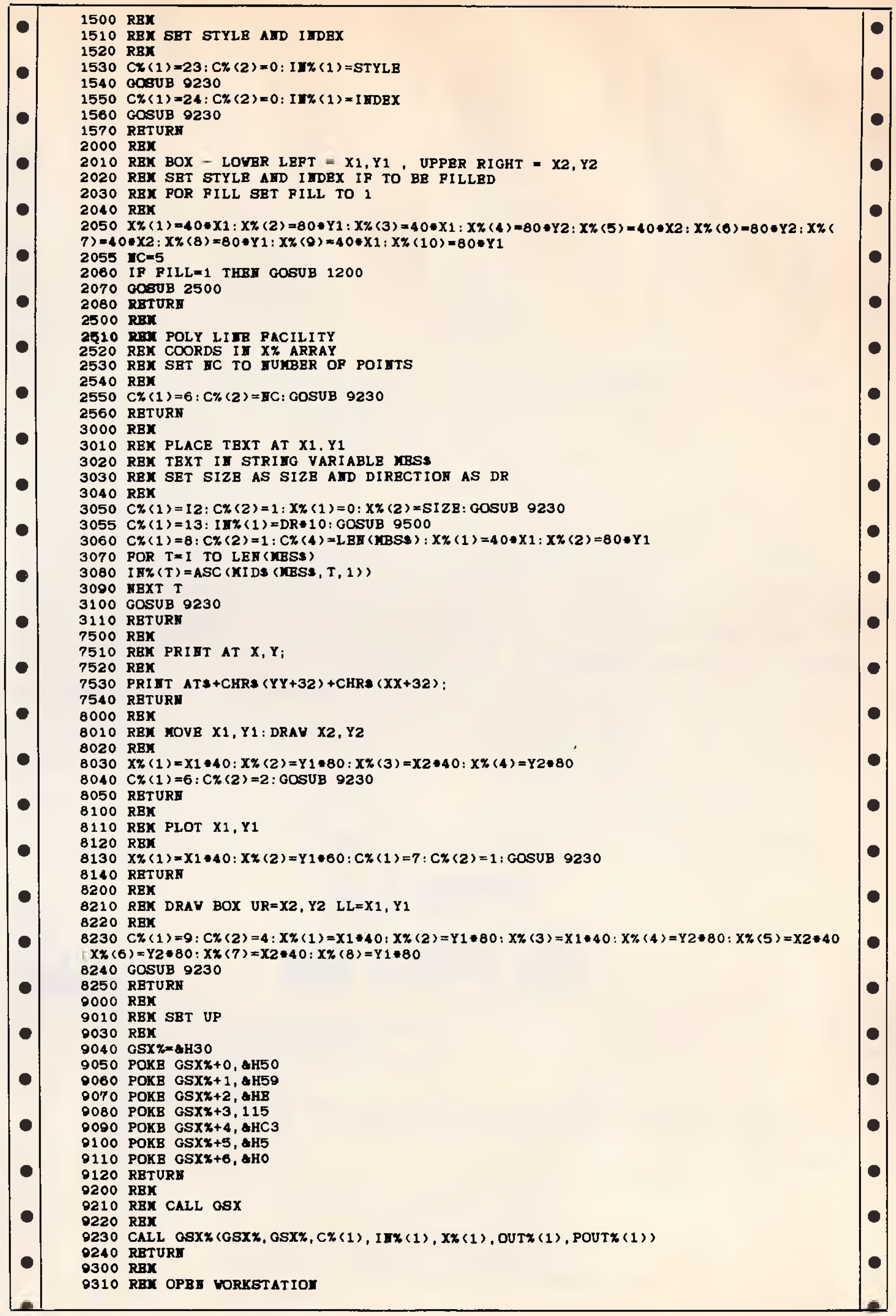
The rest of the routines are the graphics routines themselves. These perform the following: PLOT, DRAW, CIRCLE, BOX, TEXT, PRINT AT. All the graphics shapes can be filled in a wide variety of shades and styles: these 'colour' attributes are given in the fill style and index routine at line 1500. TEXT places text on the graphic screen and PRINT AT simulates a PRINT AT command. Output from the routines can go to the screen or various printers. The printers have a better resolution than the screen and can produce plots in a wider range, and so on. This facility is controlled by the workstation routines which define the capabilities of the display to be used.

When running the demonstration program, you are prompted for the output device — this should be the screen.

To see the example program, type-in and save the graphics routines (first listing) and the example program (second listing) separately. Then load the graphics routines, merge the demo program and run.



```
1 CLS$=CHR$(27)+CHR$(69):HOME$=CHR$(27)+CHR$(72):AT$=CHR$(27)+CHR$(89):BELL$=CHR
$(7)
2 PRINT CLS$+HOME$:PRINT "(S)CREEN OUTPUT , (H)IGH RES PRINTOUT OR (L)OW RES PRI
NTOUT"
3 A$=UPPER$(INKEY$):IF A$<>"S" AND A$<>"H" AND A$<>"L" THEN 3
4 IF A$="S" THEN PTR=1:DEVICE=1
5 IF A$="H" THEN PTR=0.5:DEVICE=21
6 IF A$="L" THEN PTR=0.5:DEVICE=22
9 DIM C%(6),X%(128),POUT%(12),IN%(64),OUT%(45)
10 GOSUB 9000:GOSUB 9330
15 DIM J(64),K(64)
20 REM
30 REM PLACE MAIN PROGRAM FROM HERE ONWARDS
40 REM
990 PRINT CLS$+HOME$:GOSUB 9430:END
1000 REM
1010 REM CIRCLE O1,O2,R
1020 REM SET FILL USING ROUTINE AT 1500
1030 REM
1040 PI=22/7:PII=2*PI
1050 STP=PII/63
1060 C=1
1070 FOR A=0 TO PII STEP STP
1080 J(C)=(O1*40)+((R*SIN(A))*40):K(C)=(O2*80)+(((R*COS(A))*80)*0.7*PTR)
1090 C=C+1
1100 NEXT A
1110 FOR F=1 TO 127 STEP 2
1120 C=INT((F/2)+1)
1130 X%(F)=J(C):X%(F+1)=K(C)
1140 NEXT F
1150 X%(127)=X%(1):X%(128)=X%(2)
1160 NC=64
1170 IF FILL=1 THEN 1200
1180 GOTO 2500
1200 REM POLYGON FILL ROUTINE
1210 REM COORDS IN X% ARRAY
1220 REM NO OF POINTS SET TO NC
1230 REM
1240 C%(1)=9:C%(2)=NC:GOSUB 9230
1250 RETURN
```



```
1500 REM
1510 REM SET STYLE AND INDEX
1520 REM
1530 C%(1)=23:C%(2)=0:IN%(1)=STYLE
1540 GOSUB 9230
1550 C%(1)=24:C%(2)=0:IN%(1)=INDEX
1560 GOSUB 9230
1570 RETURN
2000 REM
2010 REM BOX - LOWER LEFT = X1,Y1 , UPPER RIGHT = X2,Y2
2020 REM SET STYLE AND INDEX IF TO BE FILLED
2030 REM FOR FILL SET FILL TO 1
2040 REM
2050 X%(1)=40*X1:X%(2)=80*Y1:X%(3)=40*X1:X%(4)=80*Y2:X%(5)=40*X2:X%(6)=80*Y2:X%(
7)=40*X2:X%(8)=80*Y1:X%(9)=40*X1:X%(10)=80*Y1
2055 NC=5
2060 IF FILL=1 THEN GOSUB 1200
2070 GOSUB 2500
2080 RETURN
2500 REM
2510 REM POLY LINE FACILITY
2520 REM COORDS IN X% ARRAY
2530 REM SET NC TO NUMBER OF POINTS
2540 REM
2550 C%(1)=6:C%(2)=NC:GOSUB 9230
2560 RETURN
3000 REM
3010 REM PLACE TEXT AT X1,Y1
3020 REM TEXT IN STRING VARIABLE MES$
3030 REM SET SIZE AS SIZE AND DIRECTION AS DR
3040 REM
3050 C%(1)=I2:C%(2)=1:X%(1)=0:X%(2)=SIZE:GOSUB 9230
3055 C%(1)=13:IN%(1)=DR*10:GOSUB 9500
3060 C%(1)=8:C%(2)=1:C%(4)=LEN(MES$):X%(1)=40*X1:X%(2)=80*Y1
3070 FOR T=I TO LEN(MES$)
3080 IN%(T)=ASC(MID$(MES$,T,1))
3090 NEXT T
3100 GOSUB 9230
3110 RETURN
7500 REM
7510 REM PRINT AT X,Y;
7520 REM
7530 PRINT AT$+CHR$(YY+32)+CHR$(XX+32);
7540 RETURN
8000 REM
8010 REM MOVE X1,Y1:DRAW X2,Y2
8020 REM
8030 X%(1)=X1*40:X%(2)=Y1*80:X%(3)=X2*40:X%(4)=Y2*80
8040 C%(1)=6:C%(2)=2:GOSUB 9230
8050 RETURN
8100 REM
8110 REM PLOT X1,Y1
8120 REM
8130 X%(1)=X1*40:X%(2)=Y1*60:C%(1)=7:C%(2)=1:GOSUB 9230
8140 RETURN
8200 REM
8210 REM DRAW BOX UR=X2,Y2 LL=X1,Y1
8220 REM
8230 C%(1)=9:C%(2)=4:X%(1)=X1*40:X%(2)=Y1*80:X%(3)=X1*40:X%(4)=Y2*80:X%(5)=X2*40
:X%(6)=Y2*80:X%(7)=X2*40:X%(8)=Y1*80
8240 GOSUB 9230
8250 RETURN
9000 REM
9010 REM SET UP
9030 REM
9040 GSX%=&H30
9050 POKE GSX%+0,&H50
9060 POKE GSX%+1,&H59
9070 POKE GSX%+2,&HE
9080 POKE GSX%+3,115
9090 POKE GSX%+4,&HC3
9100 POKE GSX%+5,&H5
9110 POKE GSX%+6,&H0
9120 RETURN
9200 REM
9210 REM CALL GSX
9220 REM
9230 CALL GSX%(GSX%,GSX%,C%(1),IN%(1),X%(1),OUT%(1),POUT%(1))
9240 RETURN
9300 REM
9310 REM OPEN WORKSTATION
```

```
9320 REM
9330 C%(1)=1:C%(2)=0:C%(4)=10
9340 RESTORE 9360:FOR I=2 TO 10:READ IN%([illegible]):NEXT I
9345 IN%(1)=DEVICE
9350 GOTO 9230
[illegible] DATA 1,1,1,1,1,1,0,1,1
[illegible]
9410 REM CLOSE WORKSTATION
9420 REM
9430 C%(1)=2:C%(2)=0:C%(4)=0:GOTO 9230
9500 REM
9510 REM CALL GSX WITH ONE PARAMETER
9520 REM
9530 C%(2)=0:C%(4)=1:GOTO 9230
10000 REM
10010 REM CLEAR SCREEN
10020 REM
10030 C%(1)=3:C%(2)=0:GOSUB 9230:RETURN

100 REM
110 REM DEMO PROGRAM OF GRAPHICS ROUTINES
120 REM
130 REM     (C) JAMES O'REGAN 1986
140 REM
150 PRINT CLS$+HOME$
160 MES$="WITH THESE ROUTINES VARIOUS EFFECTS CAN BE PRODUCED":X1=20:Y1=360:SIZE
=1:DR=0:GOSUB 3000
170 MES$="FOR EXAMPLE....":X1=20:Y1=340:GOSUB 3000
180 MES$="A SINE WAVE :":X1=100:Y1=300:GOSUB 3000
185 X1=4:Y1=125
190 FOR X=0 TO ((22/7)*2) STEP 0.1
200 X2=X2+4:Y2=125+(120*(SIN(X))):GOSUB 8000:X1=X2:Y1=Y2:REM PLOT X1,Y1 AND DRAW
 TO X2,Y2
210 NEXT X
220 MES$="OR A COSINE WAVE :":X1=400:Y1=300:GOSUB 3000
230 X1=404:Y1=125+120:X2=400:Y2=125+120
240 FOR X=0 TO ((22/7)*2) STEP 0.1
250 X2=X2+4:Y2=125+(120*(COS(X))):GOSUB 8000:X1=X2:Y1=Y2
260 NEXT X
270 MES$="PRESS ANY KEY TO CARRY ON THE DEMONSTRATION":X1=150:Y1=20:GOSUB 3000
280 A$=INKEY$:IF A$="" THEN 280
290 PRINT CLS$+HOME$
300 MES$="YOU CAN ALSO DRAW CIRCLES OF VARYING SIZES....":X1=20:Y1=360:GOSUB 300
0
310 O1=400:O2=200:R=140:FILL=0:GOSUB 1000:REM UNFILLED CIRCLE AT O1,O2 WITH RADI
US R
320 O1=100:O2=100:R=80:GOSUB 1000
330 O1=260:O2=300:R=30:GOSUB 1000
340 O1=680:O2=110:R=100:GOSUB 1000
350 O1=500:O2=190:R=130:GOSUB 1000
360 MES$="PRESS ANY KEY TO CARRY ON THE DEMONSTRATION":X1=150:Y1=20:GOSUB 3000
370 A$=INKEY$:IF A$="" THEN 370
380 PRINT CLS$+HOME$
390 MES$="A BOX DRAWING ROUTINE IS ALSO AVAILABLE....":X1=20:Y1=360:GOSUB 3000
400 X1=20:Y1=20:X2=500:Y2=330:FILL=0:GOSUB 2000:REM UNFILLED BOX FROM X1,Y1 TO X
2,Y2
410 X1=100:Y1=120:X2=660:Y2=160:GOSUB 2000
420 X1=750:Y1=10:X2=790:Y2=340:GOSUB 2000
430 X1=80:Y1=220:X2=480:Y2=320:GOSUB 2000
440 X1=300:Y1=30:X2=730:Y2=280:GOSUB 2000
450 MES$="PRESS ANY KEY TO CARRY ON THE DEMONSTRATION":X1=150:Y1=20:GOSUB 3000
460 A$=INKEY$:IF A$="" THEN 460
465 PRINT CLS$+HOME$
470 MES$="YOU CAN ALSO DRAW LINES ANYWHERE ON THE SCREEN....":X1=20:Y1=360:GOSUB
 3000
480 FOR T=1 TO 100
490 X1=RND(1)*800:Y1=RND(1)*350:X2=RND(1)*800:Y2=RND(1)*350:GOSUB 8000:REM DRAW
LINE BETWEEN TWO RANDOM POINTS
500 NEXT T
510 MES$="PRESS ANY KEY TO CARRY ON THE DEMONSTRATION":X1=150:Y1=20:GOSUB 3000
520 A$=INKEY$:IF A$="" THEN 520
525 PRINT CLS$+HOME$
530 MES$="INDIVIDUAL POINTS MAY ALSO BE PLOTTED....":X1=20:Y1=360:GOSUB 3000
540 FOR T=1 TO 200
550 X1=RND(1)*800:Y1=RND(1)*350:GOSUB 8100:REM PLOT RANDOM POINTS
560 NEXT T
570 MES$="PRESS ANY KEY TO CARRY ON THE DEMONSTRATION":X1=150:Y1=20:GOSUB 3000
580 A$=INKEY$:IF A$="" THEN 580
590 PRINT CLS$+HOME$
600 MES$="AND ALL THE ROUTINES CAN BE COMBINED....":X1=20:Y1=360:GOSUB 3000
610 X1=0:Y1=0:X2=800:Y2=350:GOSUB 2000:REM DRAW BOX
```

```
620 FOR N=0 TO 800 STEP 40
630 X1=N:Y1=0:X2=800:Y2=N/2.285714:GOSUB 8000:REM DRAW LINE
640 X1=N:Y1=0:X2=0:Y2=350-(N/2.285714):GOSUB 8000
650 X1=N:Y1=350:X2=800:Y2=350-(N/2.285714):GOSUB 8000
660 X1=N:Y1=350:X2=0:Y2=N/2.285714:GOSUB 8000
670 NEXT N
680 O1=400:O2=175:R=140:GOSUB 1000:REM DRAW CIRCLE
690 FOR T=1 TO 50
700 X1=400+((RND(1)*150)-75):Y1=175+((RND(1)*150)-75):GOSUB 8100:REM PLOT RANDOM
 POINTS INSIDE CIRCLE
710 NEXT T
720 MES$="PRESS ANY KEY TO REPEAT OR SPACE BAR TO EXIT":X1=150:Y1=20:GOSUB 3000
730 A$=INKEY$:IF A$="" THEN 730
740 IF A$=" " THEN 990
750 GOTO 100
970 XX=0:YY=0:GOSUB 7500:PRINT CHR$(7);
980 A$=INKEY$:IF A$="" THEN 980
990 PRINT CLS$+HOME$:GOSUB 9430:END
```

IBM Prompt Tips

by M McDonald

The PROMPT command enables the user to change the DOS prompt from the conventional and unhelpful A>. However, IBM doesn't document another very useful facility of the PROMPT command; this undocumented facility enables you to redefine any character on the keyboard and change colours on the screen. The format these two functions take is shown below: the first is that used to redefine keyboard characters; the second to change colours.

(1) PROMPT $E[0;68;"DIR"p
(2) PROMPT $E[33;44M

The first function shows how to set up F10 for directory, the number 68 being the code for that key followed by the string you want to attach to the key; this in turn is followed by a lower-case 'p' which gives a return.

The second function sets up a colour screen with a yellow foreground (code 33) and a blue background (code 44). Being undocumented, there's much room for exploration and problems. Redefining function keys tends not to go well with non-booted programs; also, none of this works without an uncorrupted ANSI.SYS. This driver can easily be corrupted, so if these ideas don't work, try a fresh, untouched copy of ANSI.SYS.

There are a number of uses for this tip, such as converting your keyboard to the Dvorak layout or just making DOS less time consuming.

ASCII codes

ALT-A	30	ALT-N	49	CTRL-A	1	CTRL-N	14
ALT-B	48	ALT-O	24	CTRL-B	2	CTRL-O	15
ALT-C	46	ALT-P	25	CTRL-C	3	CTRL-P	16
ALT-D	32	ALT-Q	16	CTRL-D	4	CTRL-Q	17
ALT-E	18	ALT-R	31	CTRL-E	5	CTRL-R	18
ALT-F	33	ALT-S	31	CTRL-F	6	CTRL-S	19
ALT-G	34	ALT-T	20	CTRL-G	7	CTRL-T	20
ALT-H	35	ALT-U	22	CTRL-H	8	CTRL-U	21
ALT-I	23	ALT-V	47	CTRL-I	9	CTRL-V	22
ALT-J	36	ALT-W	17	CTRL-J	10	CTRL-W	23
ALT-K	37	ALT-X	45	CTRL-K	11	CTRL-X	24
ALT-L	38	ALT-Y	21	CTRL-L	12	CTRL-Y	25
ALT-M	50	ALT-Z	44	CTRL-M	13	CTRL-Z	26

Function keys

F-1	59	SHFT F-1	84	ALT F-1	104	CTRL F-1	94
F-2	60	SHFT F-2	85	ALT F-2	105	CTRLF-2	95
F-3	61	SHFT F-3	86	ALT F-3	106	CTRL F-3	96
F-4	62	SHFT F-4	87	ALT F-4	107	CTRL F-4	97
F-5	63	SHFT F-5	88	ALT F-5	108	CTRL F-5	98
F-6	64	SHFT F-6	89	ALT F-6	109	CTRL F-6	99
F-7	65	SHFT F-7	90	ALT F-7	110	CTRL F-7	100
F-8	66	SHFT F-8	91	ALT F-8	111	CTRL F-8	101
F-9	67	SHFT F-8	92	ALT F-9	112	CTRL F-9	102
F-10	68	SHFT F 10	93	ALT F-10	113	CTRL F-10	103

Colour codes

0	ALL ATTRIBUTES OFF	1	HIGH INTENSITY ON
4	UNDERSCORE ON	5	BLINKING ON
7	INVERSE VIDEO ON	8	INVISIBLE VIDEO ON
30	FOREGROUND BLACK	31	FOREGROUND RED
32	FOREGROUND GREEN	33	FOREGROUND YELLOW
34	FOREGROUND BLUE	35	FOREGROUND MAGENTA
37	FOREGROUND WHITE		
40	BACKGROUND BLACK	41	BACKGROUND RED
42	BACKGROUND GREEN	43	BACKGROUND YELLOW
44	BACKGROUND BLUE	45	BACKGROUND MAGENTA
46	BACKGROUND CYAN	47	BACKGROUND WHITE

Programs

The following routine sets up all 10 function keys:

```
PROMPT $E[0;59;“A:”;13p
PROMPT $E[0;60;“B:”;13p
PROMPT $E[0;61;“C:”;13p
PROMPT $E[0;62;“DIR”;13p
PROMPT $E[0;63;“DIR/P”;13p
PROMPT $E[0;64;“DIR/W”;13p
PROMPT $E[0;65;“MODE CO 80”;13p
PROMPT $E[0;66;“MODE MONO”;13p
PROMPT $E[0;67;“BASICA”;13p
PROMPT $E[0;68;“PROMPT”;13p
```

The following routine sets the colour screen with cyan background and blue foreground:

```
mode co 80
PROMPT $E[34;46M
CLS
```

Commodore 1541 Disk Utilities

by R Skinner
and C Whitfield

MICROTEX 666

This program is available electronically through Microtex 666's software downloading service. It is accessed through Viatel page *66637#.

This program should work with any Commodore computer and a 1541 disk drive. Its purpose is to simplify disk housekeeping to make free blocks usable and speed up the directory listing. The program has been tested on the C64 and Plus/4, and should work on all other Commodore machines with 2031, 4040 or even 1571 (C64 format only) disk drives.

The program is fully menu-driven and self-explanatory. Most sections simply emulate the commands that would usually be typed-in to perform a function. The exceptions are disk rename and the directory. The disk rename works by doing the equivalent of a POKE directly to the disk via one of the RAM buffers inside it. It isn't possible to change the disk ID using this routine. The directory routine works by PEEKing at the contents of the directory via a RAM buffer.

All the REMs can be omitted when typing-in the program. To stop the program, press RUN/STOP.

```
10 REM ****************
20 REM *DISK UTILITIES*
30 REM *BY C.WHITFIELD*
40 REM * ------------ *
50 REM * MODIFIED BY: *
60 REM * ROSS SKINNER *
70 REM *     1986     *
80 REM ****************
90 REM *** ALL REM LINES CAN BE MISSED
100 REM *** DON'T PUT A SPACE BETWEEN 'DRIVE' AND 'NUMBERS' ON LINE 1020
110 POKE53280,0:POKE53281,0:PRINT"(LGRN)"
120 V=8:D=0:D$="0"
130 REM *** MAIN SECTION
140 PRINT"(CLR)"
150 PRINT"(C/DN)(C/DN)PRESS APPROPRIATE KEY TO SELECT OPTION"
160 PRINT"(C/DN)PRESS NUMBER KEYS TO CHANGE DEVICE/DRIVENUMBERS"
170 PRINT"(C/DN)C - COMPACT DIRECTORY"
180 PRINT"D - DIRECTORY"
190 PRINT"F - FORMAT"
200 PRINT"R - RENAME A FILE"
210 PRINT"S - SCRATCH A FILE"
220 PRINT"T - RENAME DISK"
230 PRINT:PRINT
240 PRINT"(C/RT)(C/RT)(C/RT)(C/RT)(C/RT)(C/RT)(C/RT)(C/RT)(C/RT)(C/RT)(C/RT)(C/R
T)(C/RT)(C/RT)DEVICE NUMBER ="; V
750 PRINT
260 PRINT"(C/RT)(C/RT)(C/RT)(C/RT)(C/RT)(C/RT)(C/RT)(C/RT)(C/RT)(C/RT)(C/RT)(C/R
T)(C/RT)(C/RT)DISK NUMBER    =";D
270 GETA$:IFA$=""THEN270
280 IFA$="C"THEN400
290 IFA$="D"THEN420
300 IFA$="F"THEN690
310 IFA$="R"THEN810
320 IFA$="S"THEN890
330 IFA$="T"THEN990
340 IFA$="8"THENV=8:GOTO140
350 IFA$="9"THENV=9:GOTO140
360 IFA$="0"THEND$="0":D=0:GOTO140
370 IFA$="1"THEND$="1":D=1:GOTO140
380 GOTO 140
390 REM *** COMPACT (VALIDATE)
400 PRINT"(CLR)COMPACTING NOW.":OPEN15,V,15,"V"+D$:CLOSE15:GOTO140
410 REM *** DIRECTORY
420 PRINT"(CLR)"
430 OPEN1,V,0,"$"+D$
440 FORA=1TO29
450 GET#1,A$
460 IFA$=""THEN450
470 IFASC(A$)<32ORASC(A$)>128THEN490
480 PRINTA$;
490 NEXT:PRINT
500 FORB=1TO21
510 GET#1,A$
520 IFA$=""THEN510
530 IFST<>0THENCLOSE1:GOTO650
540 IFASC(A$)<32ORASC(A$)>128THEN570
550 PRINTA$;
560 NEXT
570 GET#1,A$:IFA$=""THEN570
580 IFST<>0THENCLOSE1:GOTO650
590 IFASC(A$)<>34 THEN 570
600 GET#1,A$:IFA$=""THEN600
610 IFST<>0THENCLOSE1:GOTO650
620 IFA$=" "THEN570
630 PRINT:PRINTCHR$(34);A$;
640 GOTO500
650 PRINT:PRINT"PRESS ANY KEY."
660 GETB$:IFB$=""THEN660
670 GOTO140
680 REM *** FORMAT
690 GOSUB1130
```

```
700 INPUT"NEW ID";I$
710 IFLEN(I$)>2THENPRINT" ID TOO LONG ":GOTO700
720 PRINT"ARE YOU SURE ? (Y/N)"
730 GETA$:IFA$=""THEN730
740 IFA$="Y"THEN760
750 IFA$="N"THEN140:GOTO730
760 PRINT"FORMATTING NOW"
770 OPEN15,V,15,"N"+D$+":"+N$+","+I$
780 CLOSE15
790 GOTO 140
800 REM *** FILE RENAME
810 INPUT"(CLR)OLD NAME";O$
820 IFLEN(O$)>16THENPRINT"(C/DN)NAME TOO LONG(C/DN)":INPUT"OLD NAME";O$:GOTO820
830 GOSUB1140
840 PRINT"(C/DN)RENAMING NOW":FORI=1TO1000:NEXT
850 OPEN25,V,15,"R"+D$+":"+N$+"="+O$
860 CLOSE15
870 GOTO 140
980 REM *** SCRATCH
890 INPUT"(CLR)FILE TO BE SCRATCHED";S$
900 IFLEN(S$)>16THENPRINT"(C/DN)TOD LONG":INPUT"(C/DN)FILE TO BE SCRAICHED";S$:G
OTO900
910 PRINT"(C/DN)ARE YOU SURE (Y/N) ?"
920 GETA$:IFA$="Y"THEN950
930 IFA$="N"THEN140
940 GOTO920
950 PPINT"(C/DN)SCRATCHING NOW."
960 DPEN15,V,15,"S"+D$+":"+S$
970 CLOSE15:GOTO140
980 REM *** DISK RENAME
990 GOSUB1130
1000 PRINT"(C/DN)RENAMING NOW."
1010 B$="":FORL=1TO18:B$=B$+CHR$(160):NEXTL
1020 C$=LEFT$(LEFT$(N$,16)+B$,18)
1030 OPEN15,V,15
1040 OPEN5,V,5,"#"
1050 PRINT#15,"U1:";5;D;18;0
1060 PRINT#15,"B-P";5;144
1070 PRINT#5,C$;
1080 PRINT#15,"U2:";5;D;18;0
1090 PRINT#15,"I"+D$
1100 CLOSE5:CLDSE15
1110 GOTO 140
1120 REM *** NAME INPUT ROUTINE
1130 PRINT"(CLR)"
1140 INPUT"NEW NAME";N$
1150 IF LEN(N$)>16 THEN PRINT"(C/DN)NAME TOO LONG(C/DN)":GDTO1140
1160 RETURN
```

Amiga Software

LATTICE C	$320
ASSEMBLER	$190
CAMBRIDGE LISP	$500
MCC PASCAL	$270
SHELL	$160
TOOLKIT	$160
CHESSMATE	$30

IDEAL SOFTWARE

P.O. Box 8336
Alice Springs 5750
Ph (089) 52 8852 (BBS online A/H)
BANKCARD WELCOME

$1000 REWARD

ONE THOUSAND DOLLARS

TO THE FIRST PERSON TO SOLVE THE "SULTAN'S PALACE" ON THE COMMODORE 64-128

Come to the Sultan's Palace which only has 31 rooms but has gambling and arcade action along with graphics and text. Each game is always slightly different, and can be solved by many different routes and strategies. Game is available for **$24.95**

FROM:

GARY McCLEARY SOFTWARE

P.O. BOX 24
EMU PLAINS 2750

PC-KWIK-FIX

QUICK, RELIABLE REPAIRS ON PC AND PC/XT COMPATIBLES

Ph. 452-1514 BH
or 953-8913,
981-2801 AH

P.O. BOX 849 BROOKVALE 2100

SPECIALIST SOFTWARE'S

high quality boxed 5¼" floppy diskettes with

5 YEAR WARRANTY

Prices are per box of 10 and include postage, packing and sales tax.

SSSD 48tpi (40 track)	$15
DSDD 48tpi (40 track)	$18
DSDD 96tpi (80 track)	$25
DSHD 1.6Mb	$55
3½" DSDD 135tpi (80 track)	$52

Tax exempt orders welcome.
Dealer enquiries welcome.
Send cheque, money order, bankcard or mastercard number with signature to:

SPECIALIST SOFTWARE
P.O. BOX 20, BURNSIDE, S.A. 5066
TELEPHONE (08) 269 1443
TELEX AA 88765 AD 976
26 Cassie St. Collinswood 5081

FREE DELIVERY & INSTALLATION*

NICE MODEM 2 – Auto-dial, auto-answer 300, 1200, 1200/75 & 75/1200 baud CCITT & Bell standard smart-modem with Hayes 'AT' commands $699 (tax incl).

- Proudly made in Australia
- 12-month factory warranty
- Bankcard & MasterCard

**Free delivery & installation only in the Sydney metro area, on PCs or compatible computers with an RS-232 serial port, & when you buy from me. Cable $25, comms software $20, if reqd.*

BIO CHARTER (02) 887 1913

PC-SIG

PUBLIC DOMAIN SOFTWARE

- **PC-FILE III Ver 4**
- **All BUTTONWARE software**

AUTHORISED PC-SIG DEALER

Technical Imports Australia

PO BOX 176, CROWS NEST, NSW 2065.
(02) 922 6833

At last! VIATEL for CP/M users

Do you own an Amust 816 computer, Bondwell 12 or 14, Kaypro 2, 4 or 10, Monroe 8820, or Osborne 1 or Osborne Executive?

If so, then you should be hooked up to Telecom's VIATEL, for electronic mail, banking, share transactions, and up-to-date information of all kinds.

Now you can, with VIASOFT, an easy to use and very professional VIATEL communications program for CP/M-80 computers. With six months' warranty.

$155 from

Capital Software

Box 327 PO Woden, ACT 2605,
Phone (062) 88 9228

Send a cheque today for delivery by return mail, or write for details.

COMMODORE HEAVEN

No games but everything else stocked at discount prices. We directly import hundreds of items and also deal with all the usual warehouses. Let us show you how your Commodore computer can become a powerful business machine.

We have a dozen different accounting systems, 15 or so word processors, 20 or more spreadsheets and databases but can only list some here. Visit either of our 2,000 square feet showrooms in Sydney or Melbourne to see the full range.

64 EDUCATION

MIND PROBER	$69
MIND OVER MINORS	$59
KNOW YOUR CHILD'S I.Q.	T $29
FUN MATHEMATICS	$21
IDN EDUCATION II	$25
MUSIC MACHINE	C $25
MATHEMATICE '0' LVL	$19
PHYSICS 12-16	$29
BIOLOGY 12-16	$29
BIOLOGY '0' LVL	$25
GEOGRAPHY	$29
DIVISION 6-12	T $15
ANAGRAM FUN 9-12	$15
SPELL START	$15
ENGLISH II	$19
ENGLISH III	$19
ENGLISH IV	$19
ENGLISH V	$19
EASY FINANCE III	$49
MDNEY MANAGER	$19
BBC MASTERMIND	T $39
TOUCH TYPE 64	T $19
LET'S COUNT	T $15
ALPHABET KNO-HDW	T $9
GRAPHS I	T $9
GRAPHS II	T $9
MEMORY TRAINER	T $9
FRACTIONS I	T $9
FRACTIONS II	T $9
WATER CYCLE	T $9
ADD/SUBTRACT	T $9
DECIMAL FRACTIONS	T $9
PROBLEM SOLVING I	T $9
PROBLEM SOLVING II	T $9
PLACE VALUE	T $9
SPEED BINGO/MATH	$15
MUSIC COMPOSER	$25
NUMBER LEARING X3 6-12	$19
CDMPUTER STUDIES '0' LVL	$19
STARTER KIT	$25
32 BASIC PRDGRAMS	$29
CHEMISTRY 12-16	$29
MATH I 12-16	$29
ANAGRAM FUN 7-8	T $15
SPELL START 3	$15
WORD FILE MAKER	$15
STAR SEEKER	D/T $39
SHAPES	T $9
SKILL TESTER	T $9
ALGEBRAIC RELATIONS	T $9
ELECTRONIC UNIVERSITY	$9
20th CENT. HISTORY	$25

SPECIAL INTERESTS

664-NAME GENEALOGICAL	$99

Produces 4, 5 or 6 generation family record charts to the printer or 4-generation charts to the screen. Fully indexed and with easy screen editing, 664 names, plus notes ft on each disk and several disks may be used.

ANIMAL PEDIGREE	0 $135

Produces 4 or 5 generation pedigree charts, ownership, mating, breeding, shows and award records with full indexing and screen editing. Search function for easy access.

TATTS 45 program	$B5
ASTRDLOGY PRDGRAM	$95

(Also Apple and IBM). Based on program used world-wide by professional astrologers. Provides individual horoscopes for all times and places. Much deeper than the popstyle sun astrology you see in magazines. Basically geocentric but heliocentric is possible. Koch system of Houses and Tropical Zodiac but Western Siderial is an option. Student guide lets you ask the computer questions like: What does a Gemini rising sign mean?

BRIDGE BARON	D $69

WORD PROCESSORS

TOTLWRITER	$99

Integrated word processor plus database with 10 user defined fields plus expandable spelling checker. Live screen editing, auto word wrap, global search or search and replace, set tabs like a typewriter and many other features. HELP menus make it easy to use even though it's the most powerful C64/ C128 word processor.

TOTLTEXT 64/20	D/T $59

All the usual features such as headers, footers, page numbering, block move and delete. The last file you've deleted stays on the disk in case you've made an error. Automatically inserts up to 14 lines of footnotes on each page, which makes it popular with academics. Help menus and one of the best and easiest to understand manuals. RUN and Writer's Digest compared its predecessors favouably with more than a dozen other programs. This is even better.

FLEET SYSTEM 2, 40/80 cols	$135
TOTL SPELLER	$45
TDTL KEYWDRD CROSS REFERENCE	$45
WORDPRD 128 New!	$175
WORDPRD 64	D $79
WORDPRO 3 64/PLUS 4	D $65
QUICK BROWN FOX	$99
HESWRITER	Cartridge $55
INSTA WRITER	Cartridge $39
HOMEWORD	$69
SOFTSMITH	$49
OMNIWRITER/OMNISPELL	$95
EASYMAIL by Commodore	$69
SUPERSCRIPT	D $89
SPELLPACK	D $39
PAPERBACK WRITER	D $95
EASY SCRIPT	D $79
EASY SPELL	D $39
TEXT PRO-DATA PRO tape	D $49
WORD WRITER	D $89

SPREAOSHEETS/DATABASES

TOTL INFOMASTER database	$99

RUN magazine syas "best of all." Dynamic record and field definitions. 10 files per disk, records up to 2400 characters long, fields up to 245 characters, up to 100 fields per record with repeating fields. Define your own format with sorted and selected records.

SUPERBASE 128	$169
SUPERBASE 64 (enhanced)	$169

The newest improvement to this popular British program. With audio learning cassette. Up to 1000 characters per record on up to four screens and up to 128 items per record in files of up to 16,000 characters.

STEPPING STDNES Superbase	$29

Club Membership, Accountant's Time Recording, Sales & Purchases Daybook, Cashbook, Stock Records, Solicitor's Time Recording Travel Agents, Real Estate Agents.

BUSICALC 1 64/VIC 20	T/0 $59

Commodore version of the famous VisiCalc spreadsheet. Fast machine language program. Commands include REPLICATE and copying the contents of one area into any other.

BUSICALC 3 C64/C128	D $99

Up to 999 rows and 125 columns covering 2,500 cells. Formula printout. Save with REPLACE, window framing retains rows and column headings as you scroll, high speed find etc.

SWIFT CALC w SIDEWAYS	D $99
SIDEWAYS	D $59
CALC RESULT	Cart $49
CALC RESULT ADVANCED	D $69
PAPERBACK PLANNER 128	D $95
PAPERBACK FILER 128	D $95
SALES PACK	D $59
TAS CHARTIST	D $99

ACCOUNTING

64 ACCOUNTING PACKAGE	$1B9

TOTL's newest lighting fast machine language version includes stock control and pringing of invoices and statements, concurrently updating your inventory. Choice of 4 prices for each item plus flags when re-order level is reached. Dates, postcodes etc., selectable for Australia or US. All programs lend from a master menu. Balance forward system. Invoices allow both taxable and non-taxable items and screen prompts and printed output headings can be customized to fit any business.

TOTL GENERAL LEDGER	$99

Does the whole of your final accounts.

64 ACCDUNTING	$149

Sept. '85 version. Produces at any time detailed or summary trial balances, profit and loss and balance sheets and prints reports, invoices and statements on plain or pre-printed paper. Profit centres give separate financial reports for each department and can combine into a single report. Up to 10 bank accounts may be used concurrently and each transaction split across 20 categories. 30 general ledger accounts, 250 transactions plus 700 journal entries.

TIME/MONEY MANAGER	$69
TOTL TIME MANAGEMENT	$29
TOTL HOME ACCOUNTING	$69
CONTINENTAL ACCOUNTS	$79
ID GENERAL LEDGER	D $39
KWIK CHECK	D $39
GENERAL LEDGER	D $49
DG INVOSTAT	D $45
CW SALESMAN EXPENSES	D $19
BUSINESS INVENTDRY	D $19
CW BODK LIBRARY	D $19
CW ACCOUNTS PAYABLE	D $19
CW RETAIL INVOICE	D $19
TOTL TIME MANAGER	D $29
PERSONAL ACCOUNTANT	T $39
OFFICE MASTER	D $69
CASH CONTROLLER	D $35
ACCOUNTS RECEIVABLE	D $39
TRANSACT	D $45
DG STDCKAID	D $45
CW BILL BUSTERS	D $19
ACCDUNTS RECEIVABLE	D $19
CW COIN COLLECTOR	D $19
APPOINTMENT PLANNER	D $19
CASHBOX 64	$89
CASH CONTRDLLER	$45
HOME MANAGER	$29
EH DIARY	T $12
EH EXPENSE MANAGER	T $12
EH BILL PAYER	D $29
EH BUDGET	D $25
KWIK CHECK	D $39
KWIK FILE	D $39
KWIK PAINT	D $49
KWIK SPELL	D $39
KWIK WRITE	D $39

GRAPHICS PRDGRAMS

PRINT MASTER	D $89
ART GALLERY 2	D $49
DDODLE	D $69
DOODLE meets PRINTSHOP	$59
BANNER MACHINE	D $69
DESIGNER'S PENCIL cart	D $69
GRAPHICS LIBRARY 1	D $45
GRAPHICS LIBRARY 2	$39
GRAPHICS LIBRARY 3	D $45
PRINTSHOP COMPANIDN	D $65
KWIK PRINT	D $49
DESIGNER'S PENCIL	$69
FDNT FACTORY	$69
FONT PACK	$69
KOALAGRAM SPELLING	$19
KOALA BEAR	$19
KDALA TDDL KIT	$19

64 UTILITIES

GEDS latest version	$119
FONT PACK 1 for GEOS	$99
WRITER'S WORKSHDP	$119
DESK PACK 1 for GEOS	$119
GEODEX	$119
BASIC 64 COMPILER	D $89
FUTURE FINANCE	D $29
MACRD ASSY. DEV. SYST.	D $59
LDGO	D $69
PASCAL 64 COMPILER	D $69
ASSEMBLER TUTOR	D $19
CHARTPAK 64	D $99
SUPER C	D $149
PDWER PLAN	D $99
BASIC 64	D $99
SCREEN GRAPHICS	D $39
BASIC X REFERENCE	D $45
SYNTHY 64	D $39
CDBOL	D $99
CADPAK	D $119
CAD 3D	$129
C POWER	D $139
PAL 64	D $99
LASER BASIC	D $52
MACHINE LIGHTNING	D $69
MS TOOLBOX	D $39
MS N CODER	D $39
MS D COMPILER	D $39
MS DIR+	D $39
TURBO 64 tape	D $49
MACHINE SHDP	D $79
RDBCDM cart	D $129
PROGRAMMER'S AID tape	D $35
SPEED BASIC	D $25
64 DOCTDR tape	D $39
MAGIC DISK	D $69
ACOS+ tape	D $29
TOOL 64 cart	D $35
ULTRABASIC	D $39
FORTH	D $99
MASTER 64	D $99
SPRITE AID	D $39
JOYSTICK PAINTER	D $39
LASER GENIUS	D $52
LASER COMPILER	D $52
MICRO-PROLDG	D $199
MS MASTER LOCK	D $39
D CODER	D $39
8LITZ!	D $89
ROBTEK tape alignment	D $35
1541 MAINTENANCE KIT	D $69
6502 PROF. DEV.	$45
CODE PRO	$69
MAGIC DESK !	$29

HARDWARE

LICHTSCHREIBER light pen	$79
CALDAX Mega-Kernel	$99
COCKROACH 64	$43
QUASAR 300 MODEM	$89
FERNSPRECHER MODEM	$319
MW302 INTERFACE	$149
MW 350 (CP/M 10K)	$225
MW 350 (CP/M 4K)	$189
17K PRINTER BUFFER	$35
DELUXE RS232 INTERFACE	$128
CDMMODORE/CENTRONICS	$49
XETEC Interfaces	IN STOCK
64K PRINTER BUFFER	$99
STANDARD I/F CABLE	$69
DAMS IEEE	$89
1541 FLASH	$179
QUICKSILVER IEEE 128	$299
FERNSPRECHER TRANS	$350
PARALLEL I/F	$79
I/F w SDFTWARE	$59
STAR 4K BUFFER	$139
IEEE CABLE	$79
QUICKSILVER IEEE 64	$279
DIGIDRUM	$199
COM VOICE	$89
DELUXE VOICE MASTER	$149
VDICE MASTER Jr.	$75
VIDEO DIGITIZER	$39D
CHEAT SHEETS	$5

VIC-20 PROGRAMS

VIC WRITER	$29
BUSICALC 20	$59
TDTL BUSINESS	$79
INTRODUCTION TO BASIC	S19
QUIZMASTER	$29
SPACESNAKE	$9
SKI	$9
JIGSAW	$9
HDPPIT	$9
ROBERT CARRIER'S MENU	$19
ROAD USER/HIGHWAY CODE	$19
TYPING TUTOR INVADERS	$29
MATHEMATICS/'D' LVL	$19
PHYSICS	$19
20th HISTDRY '0' LVL	$19
CHEMISTRY '0' LVL	$19
SUPER ALIEN	$19
RADAR RAT RACE	$19
VOODOO CASTLE	$19
IEEE INTERFACE	$79
RAM CARD 64K	$99
HESWRITER	$29

COMMODORE 128

GENEALOGY 128	$99
SPEEDTERM TERMINAL	$99
SUPER C	$139
CHARTPAK 128	$129
BASIC 128	$129
COBOL 128	$129
CADPAK 128	$129
C POWER 128	$189
WORDPRO 128	$99
WDRD WRITER 128	$99
WORDPRO 128S	$129
SUPER SCRIPT 128	$99
PDCKET WRITER 128	$129
SWIFTCALC 12B	$129
PAPERBACK PLANNER 128	$95
PAPERBACK FILER 128	$95
DATA MANAGER 128	$129
SUPERBASE 128	$199
128 TRICKS & TIPS	Book $45
128 CAD	Book $39
128 INTERNALS	Book $59
128 PROGRAM REF. GUIDE	$59
BASIC TRAINING	Book $39
PEEKS AND POKER	Book $39
REFERENCE CARD	$7
128 CP/M USER GUIDE	Book $45
1571 INTERNALS	Book $59
CDCKROCH TURBO RDM 128	$45
QUICKSILVER IEEE 128	$299
2-1 MONITOR CABLE	$49

COMMODORE AMIGA

TALK TO ME	$49
A-DISK (ram disk)	$69
A-FILER	$99
A-REPDRT	$99
AMIGA BASIC	$45
AMIGA DOS	$45
AMIGA TECHNICAL MANUAL	$45
ANALYZE (spread sheet)	$269
ARCHON	$69
BDRROWED TIME	$69
DELUXE PAINT	$169
HACKER	$69
MANX AZTEC C68000/AM-C-DEVELOP	$495
MANX AZTEC C68000/AM-C-COMMERC	$995
MAXICOMM	$89
MAXIDESK	$149
MINDSHADDW	$69
ONE ON ONE	$69
PERRY MASON	$69
SEVEN CITIES OF GOLD	$69
SKYFDX	$69
CENTRONICS CABLE	$49
A-TIME (real-time clock)	$129

520ST/1040ST

PERSONAL PASCAL	$129
GST CDMPILER	$149
HIPPO & COMPILER	$99
METACOMCO LATTICE C	$189
FORTH	$149
GST MACRO ASSEMBLER	$119
METACOMCO PASCAL	$139
MACROASSEMBLER	$129
SUPERTEX VIATEL TERM	$85
MACRO TERMINAL	$159
ST TALK	$79
COMPUBRIDGE (Compl. Tutorial)	$69
ULTIMA	$65
SEASTLAKER	$65
WITNESS	$65
ENCHANTER	$65
STARCROSS	$65
INFIDEL	$65
SUSPENDED	$65
MUDPIES	$39
MINDSHADOW	$69
CRIMSDN CRDWN	$59
BRATTACUS	$69
JET	$79
NINE PRINCES OF AMBER	$69
KINGS QUEST II	$69
LANDS OF HAVOC	$39
HACKER	$69
TIME BANDIT	$69
SUSPECT	$65
SPELLBREAKER	$65
CUTTHROAT	$65
WISHBRINGER	$65
DEADLINE	$65
PLANETFALL	$65
BRIDGE	$69
TRANSYLVANIA	$59
FAHRENHEIT 451	$69
HEX	$59
PAWN	$65
SUNDDG	$59
PERRY MASON	$69
ULTIMA II	$79
FLIP SIDE	$45
MAJOR MOTION	$59
BORROWED TIME	$69

BOOKS

C64 COMPUTER PROGRAM	$12
PEEKS & POKES C64	$12
MACHINE LANGUAGE C64	$14
TRICKS & TIPS FOR C64	$15
ANATOMY OF THE C64	$19
C64 IDEAS BOOK	$12
GRAPHICS BOOK	$12
ADVANCED MACH. LANG.	$14
YOUR 64 CASSETTE BOOK	$15
C64 PROGRAM REF. GUIDE	$19
32 BASIC PRDG.	$15
32 PROGRAMS w DISK	$29
WORKING C64	$19
C64 ROM DISASSEMBLY	$9
ST PRESENTING THE ATARI	$32
ST GEM PROGRAMMERS REF.	$35
ST TRICKS & TIPS	$35
ST LOGO	$35
ST INTERNALS	$35
ST MACHINE LANGUAGE	$35
ST GRAPHICS & SOUND	$35
ST PEEKS & PDKES	$32

IMPORTANT: In accordance with the custom of the industry, hardware might be exchanged but software is NOT returnable, except for replacement with the same title, if faulty. Some disk software may self-destruct if any attempt is made to copy the program and NO refund or replacement will be considered in those circumstances.

CALDAX P/L Incorporated in Victoria and trading throughout Australia as

CHAMBERS COMPUTER SUPPLIES

2nd Floor, Curtin House, 252 Swanston Street, MELBOURNE 3001 (03) 663 4441
231 Parramatta Road, ANNANDALE, SYDNEY (02) 550 0984/550 0036

WE LOVE MAIL ORDERS

TO ORDER PHONE **(03) 663 4441**

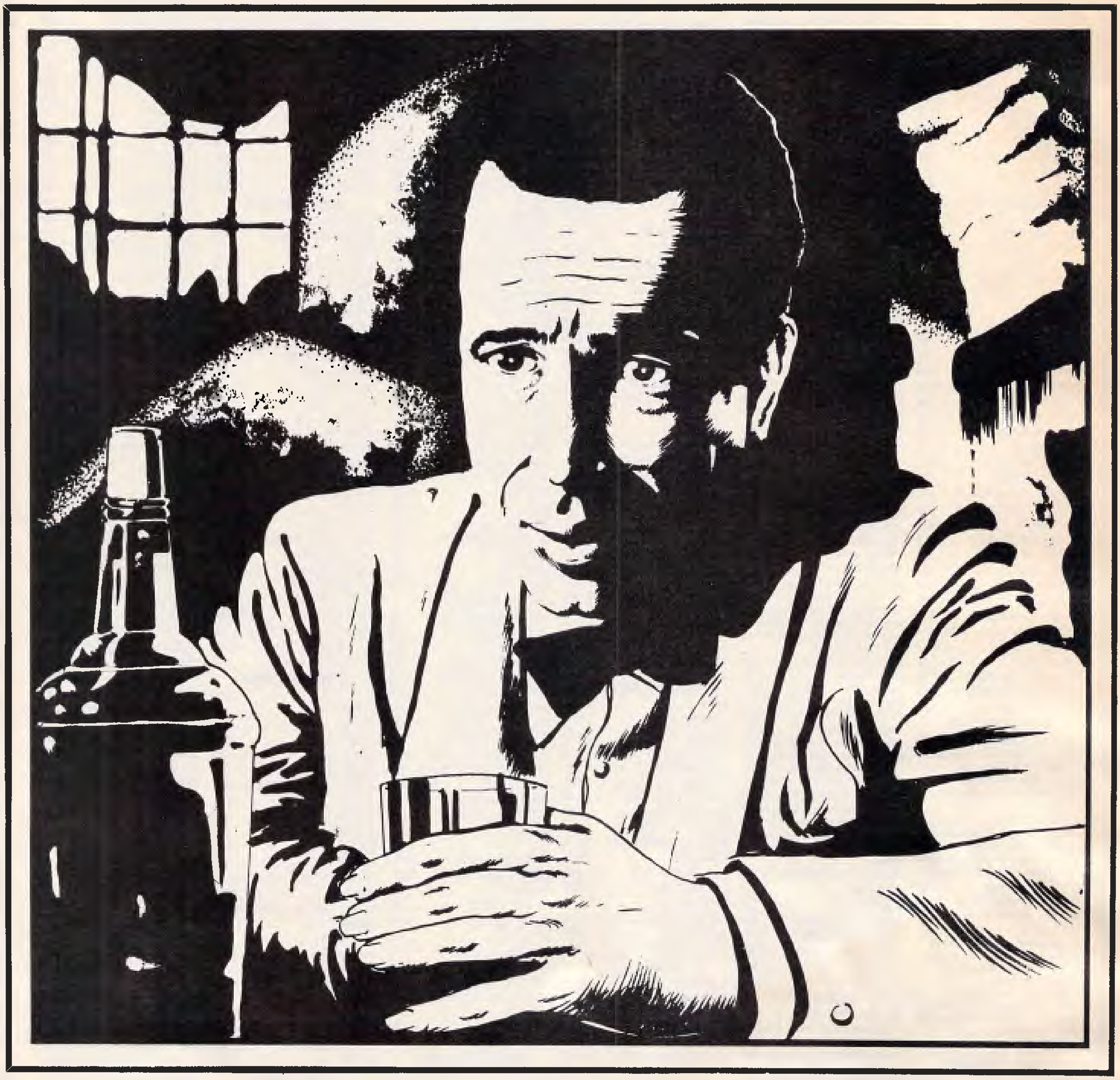
VISA • MASTERCARD • BANKCARD WELCOME

ALL ORDERS DESPATCHED WITHIN 24 HOURS. $5 POSTAGE & HANDLING ANYWHERE IN AUSTRALIA.

THE BIGGEST RANGE OF COMMODORE SOFTWARE AND ACCESSORIES IN AUSTRALIA

We import directly hundreds of lines unique to us. Drop in and check our huge range

OF ALL THE NE



...IN ALL THE TOWNS ALL OVER THE WORLD SHE WALKED INTO MY LOCAL NEWSAGENT. IF ONLY I'D TAKEN OUT A SUBSCRIPTION TO AUSTRALIAN PERSONAL COMPUTER

WSAGENTS....

You never know when it might happen to you! Avoid those awkward situations in your newspaper shop. Subscribe now to avoid real disappointment.

The benefits are clear cut — Take out a subscription now and not only will you pay less than you would by purchasing APC from a newsagent, but you will guarantee your personal copy each and every month.

Subscribe now, for 12 months, and you will beat the inevitable price rises next year . . . subscribe for 2 or 3 years and you will save even more money!

Australian Personal Computer is the best microcomputer magazine in the business. Over 5,000 readers are already aware of the benefits of taking out a subscription — and the numbers are growing daily! Have you subscribed?

If you haven't, simply complete the order form and mail today.

ORDER FORM

I would like to subscribe to *APC.*

☐ This is a new subscription ☐ This is a renewal
☐ 1 year (12 issues) Aust. only $39
☐ 2 years (24 issues) Aust. only $70 ☐ 3 years (36 issues) Aust. $114

☐ I enclose my cheque, made payable to *Australian Personal Computer for* $________
☐ Please debit my American Express/Bank Card/Visa (delete where not applicable).

Account No. ____________________ Signed ____________________
Expiry Date ____________________

Name ____

Address ____

Please send this order form with your remittance, to *Australian Personal Computer*
Subscription Dept. Freepost 280, Computer Publications Pty Ltd, 2nd floor,
215 Clarence Street, Sydney 2000. No stamp is required.

ADVERTISERS INDEX

A

Adaptive Electronics ... 4
Amsnet ... 129
Apple ... 13,14,15
ASP Microcomputers ... 117
ASTM Trading ... 101
ATS ... 86
Automatic Ice Co. ... 99

B

Bio Charter ... 164
BJE ... 95
Blackmore Industries ... 30

C

Capital Software ... 164
Cartel Personal Computer ... 96
Chambers Computer Supplies ... 114
Chinoly ... 123
Chua ... 83
Compak Computers ... 102,103
Computer Business Systems ... 61
Computer and Electronics Services ... 24,133
Computer Haven ... 71
Computer Lighthouse ... 58
Computermate ... 29
Computer Print and Paper ... 129
Continental Publications ... 70
CPN ... 95
Custom Made Software ... 95

D

Dataparts ... 88,89
Dennison ... 129
Dick Smith Electronics ... 34
Digital Audio Processing ... 17
Digital Resources ... 120
Discware ... 62,63

E

Eastcomm ... 125
Efficient Computer Service ... 133
Electromark ... 113
Elmeasco ... 91
EME ... 112
Emona ... 125

F

Fifth Generation Systems ... 117

G

Gary McCleary Software ... 164
Genesis Systems ... 20

H

Hales and Rogers ... 47
Hercules ... IFC, 1
Horation ... 142
Hypertech ... 110

I

Ideal Software ... 164
Interface Publications ... 81
Ireecon ... 84
International Software Distributors ... 94

K

KCM Computers ... 31
K & C Infocom ... 95
Kent Designs ... 117

L

Ling Yih ... 130
Logo Computer Centre ... 68,69
Lotos Computers ... 35,37,39,41
Lysco ... 95

M

Mac Bureau ... 58
Mace Reel ... 26
Manacom ... 73
Micro Dos ... 93
Micro EDP ... 76
Micro Educational ... 39,74,75
Micromania ... 119
Micron Computers ... 85
Micropro Computers ... 38
Minicomp ... 23
Microway ... 147

N

Nostradamus ... 36

O

Optsoft ... 8

P

P.C. Buyers Guide ... 127
P.C. Kwick fix ... 164
Pieces ... 168
President ... 79
Proware ... 24
Ptizan Computer Services ... 125

Q

Qubie ... 10

R

Rampage Computers ... 126
Robs Computer Centre ... 50,51
Rod Irving Electronics ... 53,54,55

S

Sailing Strong ... 141
Sant Technology ... 57
Select Software ... 42,43
Siromath ... 12
Software Express ... 59
Specialist Software ... 164
Super PC ... 106
Switchmade Power Supply ... 30
Syntax ... 41

T

Technical Imports ... 164,168
Tech Pacific ... OBC
The Computer House ... 67
The Creative Computer Co. ... 107
Toshiba ... 7,48
Total Peripherals ... 72

U

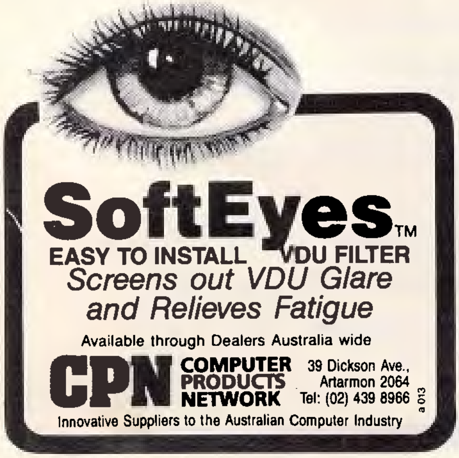
Uni-X ... 9,11
Utilico ... 39

V

Verbatim ... 16
Viatel Computers ... 100
Viatel ... IBC
Vizden ... 25

W

Wordcomm ... 64



SoftEyes™
EASY TO INSTALL VDU FILTER
Screens out VDU Glare and Relieves Fatigue
Available through Dealers Australia wide
CPN COMPUTER PRODUCTS NETWORK
39 Dickson Ave., Artarmon 2064
Tel: (02) 439 8966
a 013
Innovative Suppliers to the Australian Computer Industry

PIECES
BY COMMODORE®
AMIGA™
'SIM' PROFESSIONAL MIDI INTERFACE
IN, OUT, THRU
ONLY $59.00
from:
PIECES
18 Darmody Street
WEETANGERA ACT 2614
(Dealer Enquiries Welcome)

PC-SIG
PUBLIC DOMAIN SOFTWARE
THOUSANDS OF MS-DOS PROGRAMS
- MEMBERSHIP DIRECTORIES, NEWSLETTERS $30 EACH
- DISKS $13 EACH
- POSTAGE $2.00 PER ORDER

AUTHORISED PC-SIG DEALER
Technical Imports Australia
PO BOX 176, CROWS NEST, NSW 2065.
(02) 922 6833

BETTER FOR MICROS

Now there's an exciting new world for Personal Computer owners to explore. The world of Microtex 666 on Telecom Viatel.

All you need is a 1200/75 baud modem, the appropriate software, and a telephone line, and your PC will be ready to go.

Suddenly you'll be able to shop for software on your PC, and actually download it directly through the Viatel system. You'll be able to get PC advice and tips. Even place messages on the system for other Viatel users to read and respond to – literally a PC talkback service that lets you have a say on almost any subject.

That's just part of what Microtex 666 offers. And Microtex 666 is just part of what Telecom Viatel offers. You can also bank with Viatel, place bets, buy and sell shares, book travel, and much more. Instantly, easily, economically. 24 hours a day.

Ask for a free brochure at any Telecom Business Office. And start using your micro in a whole new, better way.

Telecom Australia
Better for Business

Hardcard™ 20. All other hard disk drives are just...thick.

Hardcard™ from the Plus Development Corporation is faster, smaller and more reliable than any other hard disk drive on a card, in the market today.

It's a breakthrough in PC mass storage design, the original hard disk drive on a PC card.

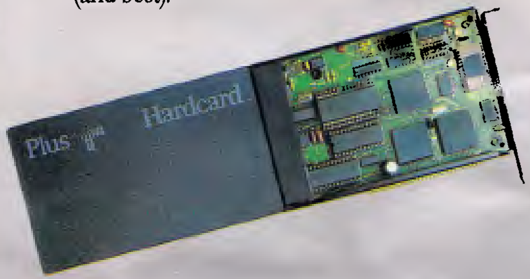
Only 25.4 mm (1″) thick, the Hardcard,™ unlike others, really does only occupy one slot in your PC or compatible.

And because of a unique head locking mechanism, Hardcard™ is virtually shockproof, making it the most portable hard disk drive around (now you can take your office with you!).

Hardcard
from **Plus**

Hardcard™ can be installed (or removed) in minutes and comes with a 12 month warranty. It's the ideal, most affordable way to turn your PC into a PCXT, or for simply adding 20 MByte of hard disk storage.

So now you don't have to sacrifice a floppy disk drive or put another box on your desk to get all the storage space you need, just call Tech Pacific on (03) 690 9055 or (02) 319 2622 for the address of your nearest Hardcard dealer. It's the original (and best).



TechPACIFIC

Plus and Hardcard are trademarks of Plus Development Corporation.

Interface/TP0073